FEBRUARY 22, 1958
VOL. 154—NO. 8

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

HELICOPTER SETS POLES

Pacific Gas & Electric Co. used this helicopter recently for pole-setting and wire-stringing in the mountains of California's Los Padres National Forest, at elevations ranging up to 4,300 feet. See page 67 for story.

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ELECTRONICS SECTION — Page 31

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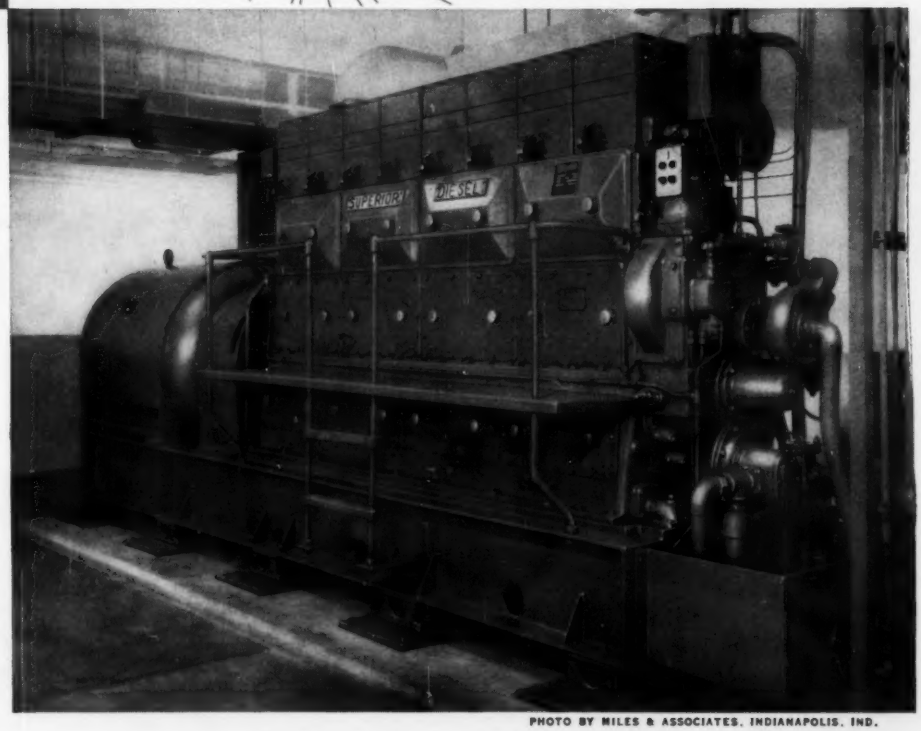

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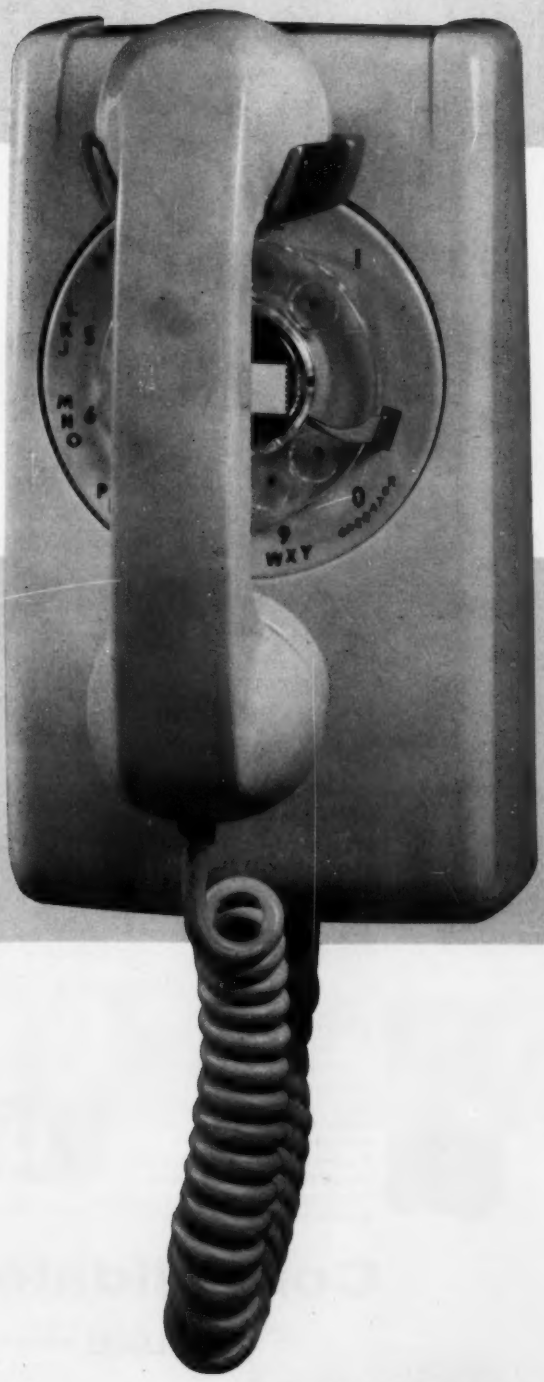

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The service is being offered at no extra charge. There are also 24 other services based on magnetic tape recordings. The most popular are sport results, the week's phonograph records, the latest news, and weather and snow reports.

•

ADDRESS UNKNOWN. The Associated Press tells of two Des Moines, Ia., men who received cards recently from a friend. A pretty routine occurrence—except for one item—both cards were addressed to the telephone number of one of the men.

•

DIVINE TRAFFIC STUDY. J. H. Shultz, general manager of the Richmond (Ind.) Home Telephone Co. sends us this story and commentary:

"Robert Horton, Eastern Indiana bureau chief for the *Indianapolis Star,* living in Richmond, Ind., reports that his 8-year-old son, Brian, after completing his prayers one evening turned to his father and said, 'Daddy, I'll bet that God's switchboard sure gets busy about this time every night.'

"Mr. Horton jokingly said that he feels that the telephone company in line with their policy of providing good service to their customers should make a study to determine if all calls were going through.

"The idea is a good one. We have often wondered if all of our calls are being completed to their particular destination."

•

GAS MASK NEEDED. An unusual request revealed an unusual problem the other day, according to the *Bell Telephone Co. of Canada News.* The request came from a store owner who asked to have his telephone deodorized. According to his story, he had been unable to use the instrument for five days—since one of his customers had used it.

The telephoning customer had unfortunately just finished handling skunks. A repairman removed the objectionable scent with ammonia.

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Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

February 22, 1958

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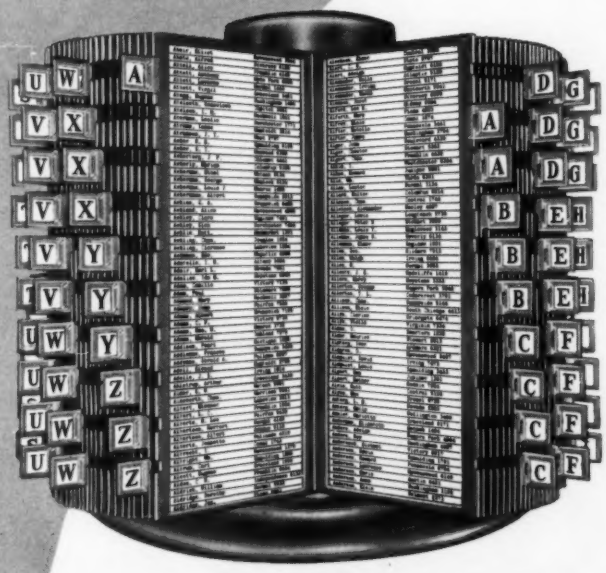

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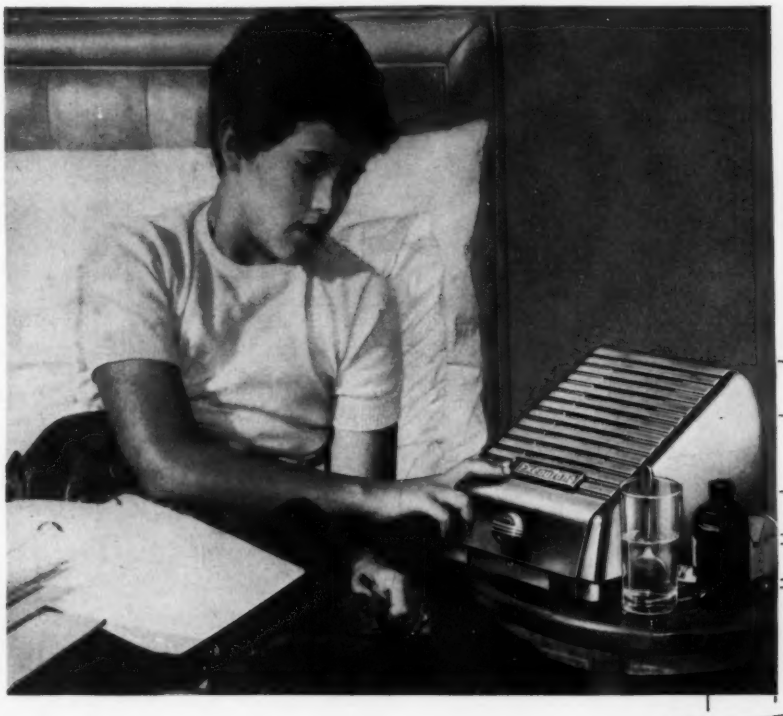

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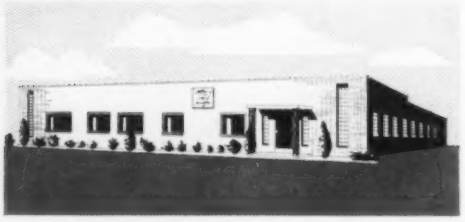

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IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR

The accusation that a FCC commissioner would use his official position to render a verdict favoring a friend, or anybody else, cannot and should not be swept under the rug. . . . Neither should the trouble at the FCC lead to general condemnation of our regulatory system. Blow-up over natural gas bill reflects little credit on a regulated utility.

THE SERIOUS charges of irregularity which darken the outlook for the Federal Communications Commission are likely to have far wider repercussions than the grave reflection cast upon that important tribunal. The earlier petty criticism of some of the members on the grounds of fudging expense accounts could be frowned upon as peanut stuff and unworthy of membership on this board.

But, the accusation that a commissioner would use his official position to render a verdict favoring a friend, or anybody else to whom he was under a financial obligation, cannot and should not be swept under the rug. Even putting the most charitable construction on the situation, as alleged before the House Sub-committee on Legislative Oversight, it would seem that any responsible member of the commission would disqualify himself under the circumstances from participating or voting on any case involving such a personal connection.

It remains to be seen whether the charges are supported by evidence and whether the explanations volunteered check with the facts. With the Federal Bureau of Investigation on the job, the situation will be sifted carefully, as it should be. No such question about the integrity of the commission or its membership should go unanswered.

Of course, it is understandable that, human nature being what it is, a certain percentage of shortcoming must be expected among the regulatory commissions as in every other calling. There are, in all, more than 250 state and federal regulatory commissioners of one kind or another in the public utility field alone. And just as we occasionally hear, with regret, about an unworthy judge, a lawyer, a doctor, an engineer, and even a member of the clergy unfaithful to his professional ideals, so we must not condemn the regulatory system because some individual might be weighed and found wanting.

And that is the real danger of developments of this kind. There are all too many people in this country who secretly hate commission regulation as a system. They do not believe in it; they do not want it. And, they have a very good reason. It is because as long as commission regulation is in existence, it acts as a powerful deterrent to a system which the enemies of regulation really want. That is, the nationalization of our public utilities and other socialistic adventures which would literally open the flood gates of bureaucratic control, arrogant favoritism, and an official caste system to be found in socialistic countries today.

It is really the business community, therefore, and the public utility business community in particular, which suffers when a bad condition of this kind develops. It cancels out much of the fine work done over the years by high-minded public servants who have dedicated their lives to making public utility regulation a success. That it is a success should be apparent to anyone who wants to look around at his telephone service, his electric service, his gas service, and his other public utility services, and compare them with the kind of a deal that the common people are getting in other countries where those services are socialized. But, it is hard to keep sane, substantial considerations like that in the foreground when sensational headlines throw around such bitter words as "bribery" and "sell-out."

Already leftish publications are coming up with editorials, such as that shopworn one that "Commission Regulation Has Broken Down." If commission regulation has broken down, what shall we have in place of it? A sensible answer would seem to be the same as the one Lord Macaulay gave to the critics of Christianity because of the evil conduct of the human race. Macaulay said it was unfair to say that the doctrine had failed when it actually had not been properly tried.

There is far less opportunity for favoritism, discrimination, venality, or oppression under the commission form of regulating public utilities than under any alternative yet tried or suggested, especially public ownership. But, because commission regulation has been the accepted system in this country, there are those who, because they do not understand, or because they have not been informed about the shortcomings of the alternatives, would give an ear to the radical suggestion that we ought to try some other plan.

And, so all public utility industries stand to lose face when a situation develops, such as appears to be the case at the FCC. It makes no difference that the telephone-telegraph industries were not involved in this particular situation under fire. That was strictly a television license deal. The fact that such irregularities could happen or may have happened is what hurts.

Responsibility of the FCC

The mixup of so many different duties under one statuatory responsibility may be a contributing factor to the difficulties at the FCC. These commissioners and their staff, for years, have

been overworked and underpaid. Much of their work load, although handled under rules of regulatory procedure, does not involve regulatory function of a "quasi-judicial" nature (to use the legal term; meaning policy decisions and interpretations under law requiring an exercise of informed judgment).

Ever since the FCC started in business, following widespread dissatisfaction with the old Federal Radio Commission, there has been wrangling about the awarding of radio station licenses. With the coming of television, this type of jockeying for station licenses and channels has been more pronounced.

It stands to reason that where there are two or more rivals standing ready, willing, and able to operate a radio or television station in an area where only one license can be given, a situation is made to order for arbitrary judgment. And, where cases have to be decided almost on an "eenie-minnie-mo" basis, the temptations of aggressive applicants to take short-cuts to gain special advantage are great. This puts considerable pressure on the FCC.

Much of this pressure, incidentally, comes from congressmen, themselves. For years, we have heard charges of "favoritism" within the FCC in this area. But nothing is done about it because no lasting remedy can be applied, as long as the prevailing set-up remains. Congress might be well advised to see what could be done about splitting up the obligations and responsibilities of the FCC into fact-finding bodies, engineering referees, financial analysts, and other experts in creating rules, standards, and tests by which the best of rival applicants can be determined. To the extent that practical and fair yardsticks can be developed and applied, in a cold-blooded fashion, the more the commission itself will be relieved of the pressure which is bound to develop whenever too much arbitrary discretion is allowed.

In the field of telephone rate regulation, as well as the public utility industry regulation, a sound and workable body of objective standards and legal principles have been developed. There may be differences as to concepts (such as valuation) or details (such as operating expenses), but, by and large, conventional public utilities know where they stand and pretty much what to expect when they come before a federal or state commission. At least they know how the rules are to be applied. But, in the grab-bag area of radio and television station licensing, there is the disturbing apprehension that any given case may turn on personal and political connection, especially where other factors are seemingly equal.

As far as the House legislative sub-committe's work is concerned, the furore over the dismissal of Dr. Bernard Schwartz makes the investigation even more difficult. Trying to look on the best side of everything, it would seem that the good doctor was trying to demonstrate how not to run an investigation. His defiance and self-confessed contempt for the committee (or at least a majority of the committee) sealed his doom. You don't insult the boss and expect to stay on the payroll.

His subsequent wild charges in a newspaper statement, in which almost every sentence began with "I accuse," recalls an obvious historical parallel. Doubtless Dr. Schwartz intended such an association of ideas. This was the form used by the French writer, Zola, in denouncing the unfair conviction of the innocent Lieutenant Dreyfus on charges of treason in the French Army early in the century. It is possible that Schwartz identified himself, mentally, with the much wronged Dreyfus and Zola's stirring defense.

But, nobody had accused Schwartz of anything more serious than popping off and leaking confidential information in violation of the commission's rule. Anyhow, the committee's majority thought that such conduct was reason enough to fire him. Still, it is doubtful if the investigation will get back on the track or accomplish anything in the way of recommendations for serious legislation.

Schwartz went out in a volley of sensational charges which the sub-committee will have to review for the record. Among those the dismissed counsel said he wished to investigate were former New York Governor Dewey, Presidential Assistant Sherman Adams, Secretary of Commerce Weeks, and "possibly" Vice President Nixon. Because such high personalities have been injected into the controversy, the sub-committee may feel that it must clear the atmosphere.

The Gas Bill Fiasco

Another development in the Nation's Capital which reflected little credit on a regulated utility enterprise was the blow-up in Texas over the bill to exempt natural gas producers from the full regulatory jurisdiction of the Federal Power Commission (FPC). Prospects for House passage of the Harris-O'Hara Bill, to ease federal controls over producers of natural gas, are now virtually nil. At least, there is general agreement with the view of House Minority Leader Martin (R., Mass.) that the bill is probably dead for this session.

Martin's statement came in the wake of a badly-timed "appreciation dinner" given in his honor by Texas oil and gas interests in the alleged hope of winning at least 65 per cent of the Republican votes for the bill. Martin, disclaiming any knowledge of the purpose of the dinner, said flatly that such a margin of Republican votes could not be delivered, that Republican support for the bill continued in the order of 50-50, and that any necessary additional votes would have to come from the Democratic side.

Before the Texas incident, the fate of the bill was very uncertain. But, after the Texas "gas" explosion, there just won't be any fight. Some of the bill's supporters last year have already announced that they will not vote for it if it comes up in the House this month. Speaker Rayburn (D., Tex.) shows signs of backing away from his previous promise to bring the bill up. Among those former supporters who are now against the bill is Representative Moulder (D., Mo.), recently resigned chairman of the House Subcommittee on Legislative Oversight. Another announced convert to the bill's opposition is Senator Flanders (R., Vt.).

Here, again, we have a demonstration of partisan politics obscuring the merits of a regulatory problem which needs correction. The fact that such a bill passed Congress twice and was vetoed by two different Presidents (Truman and Eisenhower) is an indication that there is much to be said for such legislation. As recently as last January, President Eisenhower said he is still in favor of such legislation provided it is passed on its merits. The implication is that he would not be in favor of another exercise of shenanigans such as characterized passage of the bill which he vetoed in 1956. Evidently some of the oil and gas people were unwilling to rest their case on its merits, and thought a little gravy on the side would make it go down easier. Apparently that has proven to be another serious mistake.

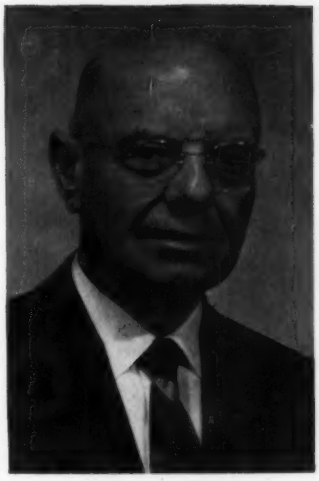
But, what about the arguments on the *merits* of the gas bill which convinced so many congressmen, persuaded President Eisenhower, and won the unanimous support of the Federal Power Commission? Are these arguments to be forgotten entirely because of an offside play by the bill's supporters? Apparently that is again to be the fate of the gas bill. And, this time it may be fatal for any such legislation.

The arguments *against* strong federal price controls are that they would discourage private initiative; that they would diminish a readiness to take

(Please turn to page 64)

Direct Inward Dialing to PABX Extension Stations

By A. W. BAERRESEN*



A. W. BAERRESEN

ARRANGEMENTS to permit private automatic branch exchange stations to be dialed directly from the public exchange telephones have been in use by some telephone companies, on a limited basis, for many years. In addition to reducing the requirements for manual switching at the PBX attendant's switchboard, direct inward dialing has many service and economic advantages in the completion of both local and toll calls. Since the in-dialing arrangements will promote the use of customer toll dialing to and from PBX stations, the subject of direct dialing to PBX extensions is now receiving active consideration. This article attempts to bring out the important features and equipment requirements and the advantages of this service from the standpoint of the telephone company and its subscribers.

General

Arrangements for direct dialing of PABX stations in step-by-step central office areas simply involve taking trunks from a central office selector level, through regular inter-office outgoing trunk repeaters to incoming selectors or connectors at the PABX. The calls are completed via the selectors and/or connectors at the subscriber's premises. Direct inward dialing trunks have thus often been provided for PBX subscribers to permit their company officials when calling in, to by-pass the PBX attendants for reasons of privacy and/or for use when the attendants are not on duty. These trunks have, therefore, been known as "executive trunks." The central office digits which are required to reach these trunks must be prefixed to the extension station number when in-dialing.

Telephone company official PBX stations have often been served from regular central office line and connector terminals so that the stations operate with direct inward and outward dialing, as is the case with any other central office station. The PBX attendant's switchboard would be reached via a group of listed number trunks in the usual way for calls from the general public. The attendants might complete these calls by dialing the extension number through the central office dial equipment, or the terminals of the "official" connector groups might be multipled on jacks in the attendant's switchboard. Also, some telephone company "official" systems have been served by PABX type switching equipment with direct incoming dial trunks from a central office selector level or levels terminating at the PABX selectors or connectors. In this case, also, the PBX extension station numbers would be regular central office numbers. However, trunking arrangements are used which require dialing only the last two, three, or four digits of the central office number on extension-to-extension calls.

Each PBX station arranged for in-dialing employs a number in the regular number series of the serving central office. This is a 2L-5N (two letter-five number) number if the serving exchange is on that basis. Thus, each PABX extension becomes a main station as far as central office numbering requirements are concerned. The assignment of blocks of main-station numbers to PBX extension stations will increase considerably (especially in the large metropolitan areas) the requirements for main-telephone numbers. This, in turn, will necessitate more central office codes in a given area than will have been indicated by numbering plans used in the past.

As will be explained later, the provision of direct inward dialing to PABX systems from a step-by-step type central office is comparatively simple. In fact, as far as inward calls are concerned, the PABX becomes a sub-office of the public central office and only a portion of the central office block of numbers is required. However, it will not be as simple or as economical to provide for in-dialing to PBX extensions from the common control central office switching systems. The No. 1 crossbar and the panel systems in use by Bell companies in the larger cities are not now equipped to out-dial pulse. Until equipment is developed and provided in these offices for direct pulsing and routing to PBXs, inward dialing to step-by-step PBX equipments from these offices must be tandemed through a No. 5 or a crossbar tandem office.

The Bell System No. 5 crossbar local offices and the crossbar tandem offices can be, and usually are, equipped to out-dial pulse, but at present must use a central office code for each outgoing trunk group. However, a rank of step-by-step switches can be used in tandem with these switching systems to distribute traffic from one central office code to several PBXs. Equipment may be added to these common-control systems, however, in order to permit distribution to a number of

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*Mr. Baerresen is a telephone traffic consultant. He authored the following articles appearing in TELEPHONY: "Terminal-Per-Station Operation of Telephone Party Lines," Aug. 25 and Sept. 1, 1956 issues; "Traffic Line and Terminal Assignment in Automatic Equipment," Aug. 3, 1957 issue; "Advantages of Dial Assistance Service (DSA)," Sept. 7, 1957 issue.

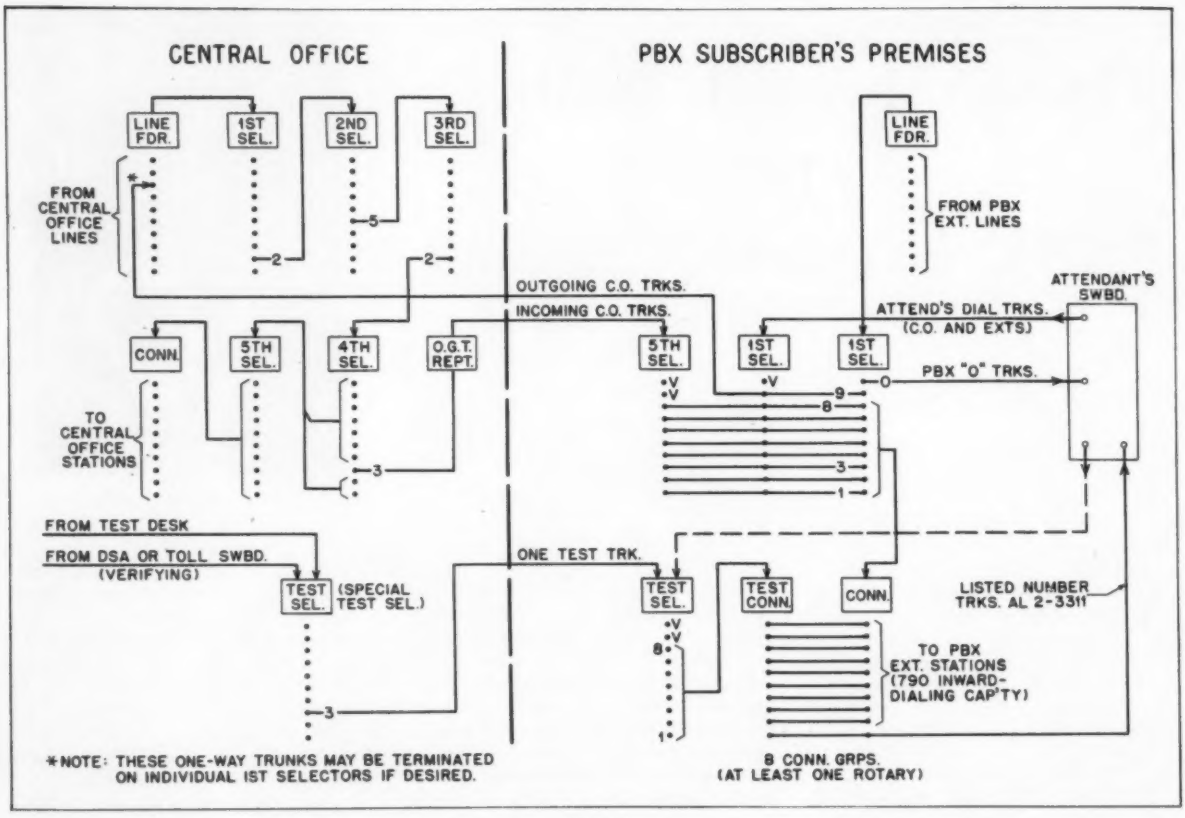


Fig. 1

PBX trunk groups served by one central office code, thus avoiding the use of the step-by-step switches for this distribution.

It might possibly be feasible to employ converters at a PABX to accept reverting pulses directly from a serving panel or No. 1 crossbar office and convert them to step-by-step dial pulses to operate the PABX switches. Such converters are now in use in an Independent company's suburban step-by-step offices in the Chicago area to permit Chicago (panel and No. 1 crossbar equipment) subscribers to dial extended service calls to the Independent company offices. Such converters might, therefore, be applied to a PABX under similar circumstances if the PBX were large enough to warrant the expense.

Since the great majority of the central offices of the Independent telephone companies in this country operate on the step-by-step principle, step-by-step central offices only will be considered in this article. Practically all PABXs use step-by-step type equipment or operate from step-by-step dial pulses.

Advantages of Inward Dialing to PBX Extension Stations

Subscriber Advantages. (1) The PBX subscriber may realize a substantial saving in attendant's wages and associated costs, since an attendants' services are not needed on calls directly dialed to the extension station from the central office. In many instances as high as 90 per cent of the inward calls to a PBX may be directly in-dialed. At most PABXs, the attendant's operating work consists largely of handling in-coming calls. A considerable saving may be realized, since the cost to the subscriber of covering an attendant's switchboard position is about $300 per month.

(2) In-coming service is much faster and more accurate. On encountering a busy extension station, or one that doesn't answer, the caller can immediately hang up and make subsequent attempts at his own convenience and without waiting for the attendant's answering or reports. He receives audible machine ringing of the called extension. He does not forefeit a message rate or coin station charge on encountering an extension "busy" or "don't answer," as is the case if the call is placed via an attendant. However, when the attendant's services are required or desired on an inward call (such as where the extension number is not known, or when a call-back or waiting for a busy extension is desired, or the call transferred, etc.), the attendant can be reached in the regular way by calling the listed PBX number.

(3) Additional privacy is provided.

(4) Night connections are unnecessary since the extensions may at all times be directly dialed from the central office. Of course, if an "after-hours" answer to the listed number is desired, a night connection for this purpose may be made to a convenient station.

(5) A smaller proportion of toll calls to PBXs will be placed on the person-to-person basis. On a station-to-station toll call to the listed number, the toll timing begins at the answer of the attendant and applies whether or not the desired station is busy or does not answer. With direct toll calling to the extension, station-to-station toll service is comparable to that to a main station.

(6) With each extension station having a regular central office number, outgoing toll calls may be charged to, and billed by the telephone company to, the individual extension station

number. This reduces the need for charge quoting. Extension station users may, therefore, enjoy the faster customer-dialed toll service when available, even though the cost of each toll call must be accounted for.

Advantages to the Telephone Co. (1) In-dialed calls to PABX extensions are completed on an average of from 20 to 28 seconds faster than calls to such stations placed through the attendant. The wait for the attendant's answer to the incoming trunk signal, the passing of the name or number wanted, the waiting for the attendant's reports and for busy stations to be released, make up this extra time consumed by switching through the PBX switchboard. Thus, the holding time on calls directly dialed to PBX extensions is reduced by this 20 to 28 seconds, resulting in a reduction in the required capacity of the telephone company's central office switching equipment and inter-office trunk circuits. This saving may be considerable in an exchange having a number of larger PABXs.

(2) The additional switching equipment required at the premises of the PBX customer produces more revenue for the telephone company. These additional equipment costs to the subscriber should be adequately covered by the customer's savings in attendants' wages.

(3) Telephone company toll operating costs are reduced for the following reasons:

(a) Outward toll operating time on attempts to reach a PBX extension (when the called extension station number is known) is reduced by eliminating the manual switch at the PBX attendant switchboard.

(b) The proportion of person-to-person toll calls to the PBX is reduced.

(c) Charge quoting on outward toll calls from the PBX is reduced.

(d) Where the central office is provided with the centralized type of customer toll dialing equipment, greater use will be made of this service by the PBX stations because of the facility for billing such toll calls to the individual stations. (This is explained later.) Also, customer toll dialing to PBXs will be increased because of the reduction in person-to-person toll calling.

Equipment Arrangements

Fig. 1 illustrates a typical trunking arrangement for inward dialing to a PABX system from a step-by-step central office. A PABX having a capacity of 790 in-dialing stations is shown.

In this example, 1,000 central office numbers (xxx-3000 to xxx-3999) are allocated to the PBX. This, of course, increases the requirements for central office numbers, which, in turn, may necessitate that an additional central office code be used at an earlier date than would be the case with non-integrated PBX extension numbering. The in-dialing PABX extension numbers are, in effect, main station numbers and will have the same number of digits as the serving central office numbers (in this case, seven). However, extension to extension calls in this case are dialed by using only the last three digits of the full central office number.

It will be noted that the PBX "listed number" trunks to the attendant's switchboard are originated from a local PBX connector group, which, of course, should be of the rotary (trunk hunting) type. However, these attendant trunks could be taken from a vacant selector level at the PABX through PBX trunk equipments (arranged to absorb the two final digits) to the attendant's switchboard. In the installation illustrated, these could be served from the vacant ninth or 10th level of the incoming fifth selectors.

The listed number trunks are thus included in the inward dialing block of numbers assigned to the PBX. This saves a separate listed number group from the central office and the use of central office fifth selectors and connectors and the need for maintaining reservations for growth of the PBX system in central office rotary or level-hunting connector terminals.

With inward dialing, the calls completed via the attendant to extension stations should be comparatively few. Therefore, generally it will not be necessary to provide a multiple of the PABX connector terminals in the switchboard. The attendant establishes the connection by dialing the last three digits of the extension number over her trunks to PABX first selectors. This latter trunk group may also be used for central office calls as indicated. If the attendant originates an appreciable volume of central office

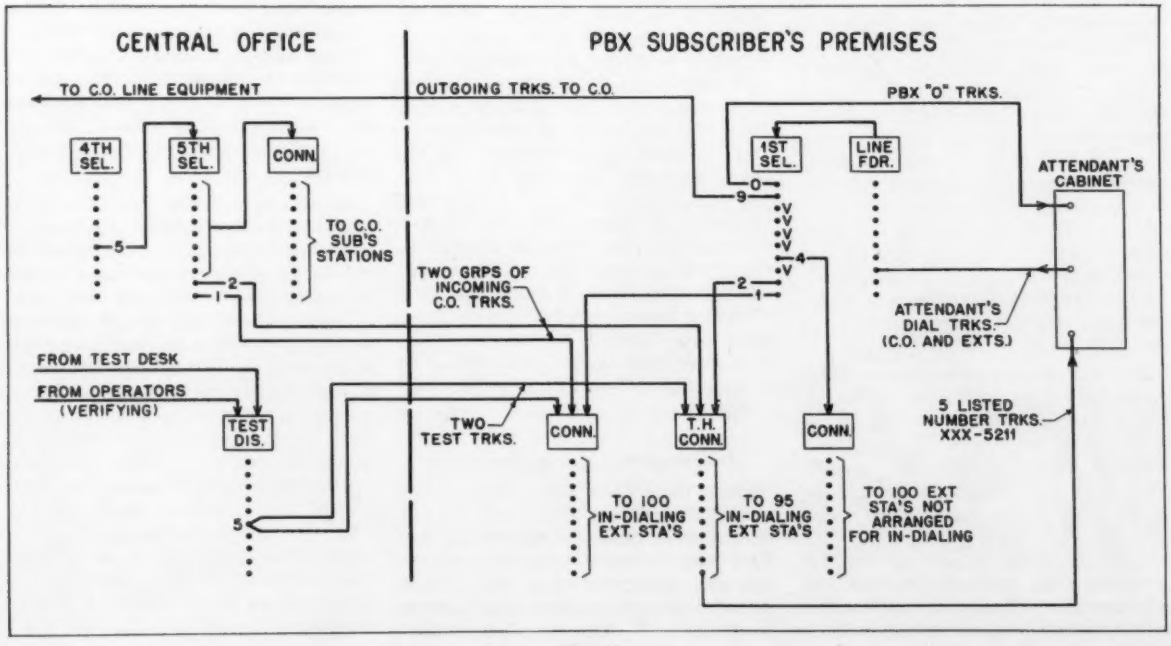


Fig. 2

calls, a multiple of the outgoing (ninth level) trunks might be provided in the switchboard.

If a test-train is used in the central office, one may be provided at the PABX to permit the central office DSA (Dial Service Assistance) and toll operators to verify busy extension lines as is done for any other main station line in the central office. This would also allow extension lines to be tested from the central office test desk. With the test-train arrangement shown in *Fig. 1*, the PABX test connectors would be accessed from a test selector at the PBX, the trunk to which is reached via a special test selector in the central office. The regular test-distributor switch for the central office unit could not be used unless eight test trunks (instead of one) were provided to the PBX terminating on the eight test connectors. The regular test-distributor terminals for the hundreds in use for the PBX could be arranged to return a tone when dialed so as to indicate that the special PBX test trunks should be used.

120 IPM (Impulse Per Minute) tone should be provided at the PBX selectors for the all-paths-busy condition, so as to provide the standard all-paths-busy signal to inward dialed calls.

Intercepting arrangements should be provided as discussed later.

Central office toll switching trains (which in the past have been employed to provide toll transmission, flashing busy signals to the toll operator, and control of the ringing of connectors by these operators) are no longer considered necessary to meet the requirements of the nationwide toll mechanization program. Toll trains are generally not now being provided in new central office units. Whenever it becomes desirable to provide inward dialing to a PABX, an engineering study should be made to determine whether or not the existing central office circuits and trunks are suitable for interconnection with the PABX train for incoming toll as well as for local traffic. Compatibility of circuits and equipment will have a strong bearing on the economy of the project.

Fig. 2 illustrates an arrangement for direct inward dialing to a small PABX where intitially only two levels of the final central office selectors have been allocated; that is, only 200 central office numbers. In this case, two groups of incoming trunks to the PBX would be required, terminating on PBX connectors. Capacity is provided for 200 in-dialing PBX extension stations less the number of "listed number" trunks to the attendant's answering cabinet. Additional in-dialing extension capacity can be provided by employing a third incoming central office trunk group from an additional central office fifth-selector level, or a full 1,000 central office numbers may be allocated, resulting in the arrangement shown in *Fig. 1*.

Fig. 2 also illustrates the provision of some extension stations not arranged to receive directly in-dialed central office calls, and, therefore, not requiring central office numbers. Such stations may be assigned to employes or locations which receive but few central office calls. Central office calls to these stations would have to be made over the listed number and be completed by the attendant. However, the arrangement shown in *Fig. 2* has a serious disadvantage. The numbers xxx-54xx are indicated as being used in the central office. An outside caller might, in this case, attempt to dial a non-indialing extension, such as 432, by dialing xxx-5432 and would reach a wrong number. Careful instruction and number listing in the subscriber's PBX directory might minimize this difficulty. To avoid this possibility for wrong numbers, it would be necessary to leave vacant and intercept the 54 hundred numbers in the central office, which might be costly where a shortage of numbers exists.

Additional Dial Equipment Required at PABX

Arrangement for in-dialing will require the addition of a selector to terminate each incoming central office trunk, and the addition of one or more connectors in each connector group to carry the in-dialed calls, which were formerly completed via the attendant's jack multiple of the extension stations. Also, one or two test selectors and a test connector in each connector group may be required. Additional central office trunks may be needed if a former two-way group is changed to one-way operation as illustrated in *Figs. 1* and *2*, but there is some saving in in-coming trunk requirements due to the reduced holding time on these calls. On the other hand, some attendants' positions, the extension station jack multiple and some relay equipment for switchboard terminations may be eliminated.

Intercepting Arrangements

Since the PBX station numbers arranged for inward dialing are in the central office numbering series, all the PBX vacant levels and non-working connector terminals which may be accessed from the central office should be intercepted. The most economical means of providing this service is by the use of a recorded announcement machine. The wording of the intercepting announcement might be: "The number you have reached is that of a non-working station in the telephone system of the Smith Mfg. Co. If you will dial Alpha 2-3311 between 8 a.m. and 5 p.m. on week days, the Smith company attendant may help you. This is a recording."

If the intercepting trunks were connected to the attendant's switchboard for a manual answer, these trunks would not be answered when an attendant is not on duty. Intercepting trunks to the attendant in a message-rate or subscriber-toll-dialing area should return "off hook" supervision to the incoming central office trunks; otherwise connections could be made through the attendant's switchboard on a non-charge basis.

Outward Dialing from PABX Systems

No change is involved in placing outward calls from a PABX because of inward-dialing arrangements. The extension users, by dialing the routing digit "9," is connected to central office line equipment in the conventional manner for dialing local calls or for placing toll calls with the central office operators. Subscribers' toll-dialing service would also be available to the extension user if the central office were so equipped.

If the central office is equipped for customer toll dialing and employs checking operators (Centralized Automatic Toll Ticketing or Bell CAMA systems) for obtaining and "keying" calling station numbers into the toll ticketing equipment, these checking operators would be given the extension station central office number, and the call could be billed to the individual extension.

If automatic number identification is provided for the central office and no checking operators are employed, it will not be possible to have billing to PABX extension numbers (unless automatic detection were provided at the PABX) and extension dialed toll calls would be charged to the listed number trunks as at present. Circuit arrangements may possibly be developed which would make it feasible to equip the larger PABXs with automatic detectors and means for transmitting the extension station identity over the trunks to the central office ticketing equipment. This would provide automatic number detection and permit billing to the extension station making the toll call.

(Please turn to page 66)

Design and Operation of Small Companies

By R. J. POLLOCK

Part 12

Rate Picture

THE VARIOUS theories followed in determining the rates to be charged for telephone service remind one of some modern paintings because the completed pictures may not appear to have any connection with the titles given to the paintings.

However, in rate-making, the training one has will go a long way in establishing a picture in one's mind, the clearness of which will depend on his viewpoint, whether he is a customer, a representative of the telephone company, or a member of a regulatory commission. The viewpoints of a company representative and a commission member might be affected by law, or other precedent, so that in *most* cases the difference in theory might not be too great. But a considerable difference might be found between the customer's viewpoint and that of the company, and even that of the commission.

The average subscriber (and for that matter many of our telephone people not performing work in connection with revenue requirements) does not know too much about the theory of rate-making. However, the affect of subscribers' thinking on the final rate picture should merit some study.

While many regulatory commissions give the impression that public opinion has little direct bearing on their judgment in setting the rates which they authorize, it is doubtful if there is a commission that would admit that it does not consider public opinion in allowing a rate-of-return to a company it regulates, which after all is bottomed on rates, themselves. So, in the final analysis, we can say that public opinion does play an important part in the regulation phase of rate-making, indirect if not direct.

However, in this writer's estimation, the average telephone subscriber is not too well versed about so-called rate-of-return and has little knowledge as to what it is, how it is arrived at, and perhaps, most important of all, how much it should be to permit a telephone company to be operated on a sound financial basis. This condition, in our opinion, is the seat of a lot of the trouble telephone companies have on rates.

The small exchange manager, who is in a position to have direct contact with most of his customers can, and should, do some personal educational work explaining this point to the public, but some of us in large exchanges are not in a position to have such personal contact with too many subscribers. However, in large centers, it should not require an excessive amount of time to ascertain what the average telephone user thinks of when he hears or reads the term, "rate-of-return." He can visualize the meaning of the word "profit" on an investment, but the terms and methods used in arriving at a return for a telephone company might introduce some misunderstandings and questions in his mind as to first, just what is a rate-of-return and, second, after he finds out, what is a fair return for a telephone company. It is this writer's opinion that we of the telephone industry should turn our thoughts towards finding more and better ways to educate the public as to the real meaning of such terms used by the industry and regulatory commissions.

Recently, a very good friend of mine, active in both state and national politics, made a statement to the effect that the investment in telephone plant was too high for the service rendered. Actually, his experience in any phase of the telephone business is extremely limited, so someone did a very good job of convincing him that this idea was correct. But, what are we telephone people, as a whole, doing to counteract such mistaken and unfounded opinions?

In many cases, public acceptance of increased rates, although found to be fair by the commission, is limited which would suggest that somewhere along the line companies and the commissions have failed in explaining how and why the rates are established. Likewise, many of us, actually engaged in the communication field, do not give proper weight to the rate picture as it affects, and is affected by, other phases of the operating field. In other words, we see only that part of the picture that pertains to the job we are responsible for and the rest of it is taken for granted. We hope that the rate-payers will understand and see the complete picture and, if they don't, we brush it off and say: "Well the increase has been authorized by the commission, so what."

It might well be that a bigger part of our advertising and merchandising activities could be directed toward public education as to the aims of the telephone company and its obligations to the customer, to employes, and to investors.

Also, a well-planned educational program directed to the public on a person-to-person basis, as can be accomplished in the small exchange, could have a far-reaching effect in the job of promoting public understanding of our rate and service problems, providing it were not done on the win-the-argument basis. We know what we want to accomplish in an education program, but how we set out to do it is another matter. Do we want to dominate the scene with a lot of high-sounding terms and figures which might indicate our super-intelligence and make the "other guy" look dumb, or do we want to guide the public in convincing itself that what we have offered is factual and truthful—in other words, letting the public do its own thinking about our operations? In our opinion, the latter is the best method of approach, but, of course, we must see that the public's thinking is directed in the proper and true channel.

The matter of "regulated" thinking brings up another situation which might not have a direct application in a discussion of the over-all rate picture, but it might open up further thought on rates charged for a type of service which is very much on the increase.

It has been the practice of telephone companies, both large and small, to rent circuit facilities to private and

governmental agencies for non-telephone purposes at rates below those charged for conventional use of the facilities. The cable pairs may be used for a local radio loop, as a circuit for a time control device, or for local fire alarm purposes. Usually these services are covered by some form of agreement or contract signed by both the telephone company and the users.

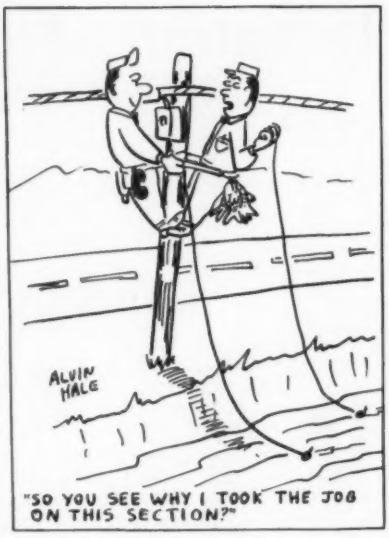
Let's discuss the case of a fire alarm circuit. Here, the telephone company, for a consideration, agrees to furnish and maintain the cable pair for fire alarm purposes, and the rental agreement generally will contain a clause releasing the company from any and all liability due to failure from causes beyond its control.

Now, the company may be protected as far as the city governmental body is concerned, but what about the third party whose house may have burned down because of the failure of the alarm circuit? If a legal precedent has not been established already, there is a possibility that one could be forthcoming because of the increased use of telephone facilities with the trend toward dial operation. It would seem that some study further should be made of any rates presently being charged, in light of the increased risks that might be involved, not only in connection with fire alarm circuits, but for all non-telephone uses.

Recently, a local newspaper carried an article covering a hearing before a public service commission representative, in which a small local bus company was attempting to curtail part of the service it renders on some routes serving the city and adjacent suburban areas. This may not appear to have any connection with a discussion of telephone rates, but certain aspects of the situation are paralleled in operation of small telephone companies.

Both the telephone company and the bus line are supplying a service which is in general demand and is paid for at rates which are approved by a regulatory commission. These rates are, or should be, adequate to cover operating and maintenance costs and to provide a fair return on the investment in facilities and plant.

This particular hearing was called because the transit company had shown that it was operating at a loss during the previous year, and it proposed to reduce the loss by curtailing some of its low-revenue producing service. The commission representatives advised the company that one day had been allowed for the presentation of testimony and, if the testimony was not completed within that time, the hearing would have to be postponed because



another hearing had been scheduled for the following day. Incidentally, it would be interesting to learn what other type of hearing was so important as to supersede one which deals with the vital transportation system of a community.

Request for authority to curtail service on sub-marginal routes to reduce or eliminate financial losses is more or less a standard practice with transportation companies. In this particular hearing, considerable testimony relating to operating costs on the low-revenue producing routes was offered by the company management, while the questioning by the attorney representing the city covered the over-all operating picture in such a manner as to imply that the earnings on the better-paying routes were sufficient to cover all operations and offset the losses on other routes.

The same situation is frequently encountered in the telephone field in regard to large exchanges "subsidizing" small exchanges and, while this theory might have some application in the case of a company having both large and small exchanges, in the case of the average small company with one or more small exchanges, the so-called subsidization theory cannot work. This is true because of the limited volume of business available, and because there is an economic limit beyond which rates cannot go in small exchanges, leaving little possibility of subsidization of one by another. Therefore, if a company has only small exchanges, each must be more or less self-supporting.

Incidentally, the bus company also presented testimony showing that its three stockowners were paid employes, two of which served on part-time and one on the full-time basis. Other than this, no other payments were made to any of them for the simple reason that no funds were available. The logical conclusion to be drawn from this case is that, unless drastic action is taken to place this company on a sounder financial basis, the public will wake up some day in the not too distant future to find that their transportation system has gone bankrupt. Despite the fact that this possibility was brought out, perhaps resulting in the city taking over the operation of the bus system, and charging rates which would not be subject to outside regulation, very little, if any, public interest was evident in the transit company's problem.

The nonchalant attitude on the part of the commission toward the bus company investors, coupled with the city attorney's attitude, which indicated he was not disturbed by the threat of municipal ownership of the transit company, has a close parallel in many telephone rate hearings.

However, we know of one situation where the thinking of 25 telephone subscribers regarding public ownership has been revised considerably during the past two years. These people formed their own roadway company when they thought that the telephone company's service rates, and construction charges to build facilities to their isolated location were too high.

When the job was completed they divided the construction cost between them and set up a rate to take care of the switching charges only. After 18 months of operation, their costs have exceeded those originally estimated, due mainly to maintenance and replacement costs which were not included in their original cost estimate. Today, these people would happily turn over "for free" their 10 miles of pole line and associated facilities to the company doing their switching if they would be accepted as company customers at its standard rates.

The experience of these people has re-emphasized a condition which is evident in all telephone companies—the high cost of maintaining station facilities on customers' premises compared to those in the rest of the plant. This particular item will be discussed further in the final article of this series. The condition is brought out here only to emphasize the effect it has on telephone rates and public relations and is phrased in this simple question for your consideration: Why is it necessary for the telephone company to own and maintain the facilities on customer's premises?

(To Be Continued)

TELEPHONY'S Traffic Engineering Handbook

By Gilbert R. Brackett **Feb. 22, 1958**

Section 11 (continued)
Miscellaneous Traffic Information

Grade of Service, as used in automatic office capacity tables, can be defined as that portion of calls which are lost because of facility shortage in the equipment train. It should be apparent, in setting up a grade of service, that consideration must be given to the fact that not all calls which meet up with a busy do so because of equipment shortages. Some originating calls will be lost because of equipment reactions while others will run into the called line being busy.

One must not lose sight of the fact, however, that even small overages above the predicted traffic maximum will result in relatively large increases in the portion of lost calls, due to the reason that with the switches already busy, nearly the entire increase in calls will fail to find idle paths. The choice of the *Grade of Service* to be set is governed by the local concept of the service that will best meet public acceptance.

Trunk group efficiency, sometimes referred to as the "Per cent Occupied Time," is the radio of the holding time of calls actually carried by the trunk group to the holding time if all the trunks were constantly in use. As the number of trunks in a group is increased, the efficiency of the group also increases.

Manual Switch Counts
(One-minute Intervals)

60 ÷ 100 = .6 times the number of busy switches in the group equals the CCS per group.

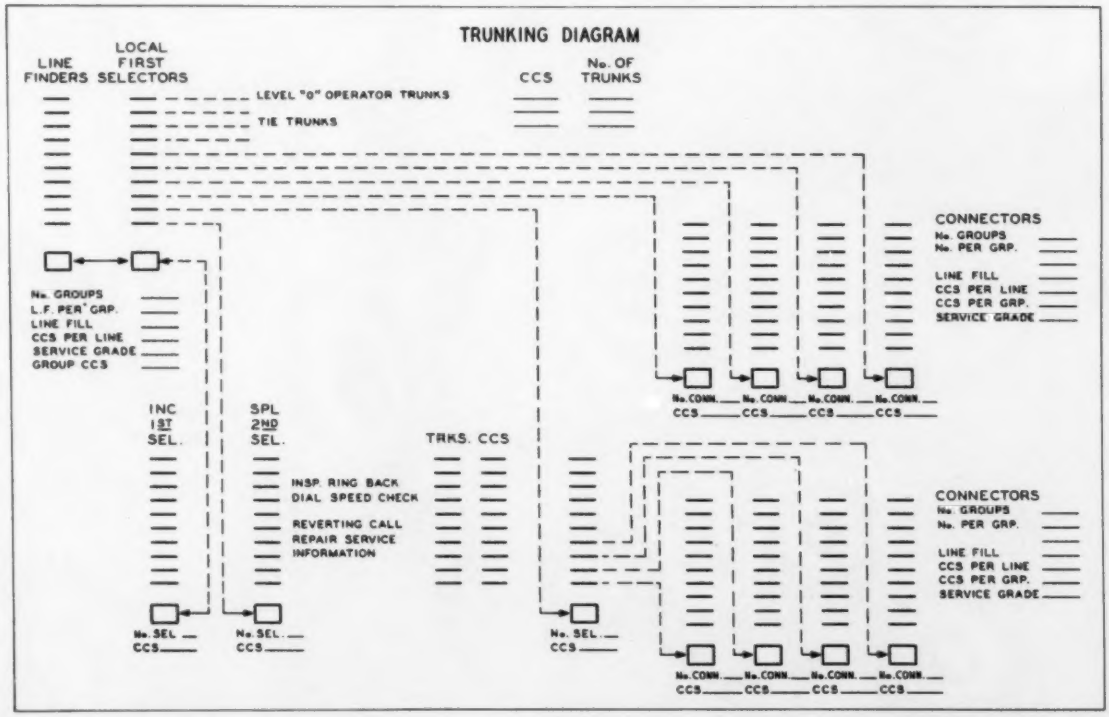
(Two-minute Intervals)

120 ÷ 100 = 1.2 times the number of busy switches in the group equals the CCS per group.

The CCS per line times the lines in the group equals the number of line finders per group.

The CCS capacity of the line finder group divided by

(Please turn to page 30)



LEGEND: The quantities of switching apparatus and trunking facilities are determined by the traffic engineer and indicated in the appropriate diagram areas. Both equipment and trunk quantities required and the CCS that supports the quantities shall be shown for each trunk or equipment group. All equipment components shall be grouped together. A diagram of this kind will practically eliminate the possibility of overlooking any needed equipment. It is also a handy tool for rechecking the group computations. It can be used as a check against installation and costs of the office and to confirm that the installation meets with the requirements engineered.

NORTH WALL PHONES

NEW CONVENIENCE IN KITCHEN, LAUNDRY, WORKSHOP EXTENSIONS

Step saving convenience, a real boon to modern homemakers, reaches its ultimate in the kitchen extension telephone. The North Wall Phone is the perfect telephone for installation in the kitchen, laundry, home workshop, or any other area where counter top space is at a premium.

North Wall Phones, available in black or a choice of seven Color-Tones, add to the decor with their classic simplicity of line – no awkward looking protrusions or dust catching hollows.

North Wall Phones can be positioned anywhere for maximum convenience – at a height for complete ease of use and out of reach of children where desirable.

You can merchandise additional revenue producing extensions with North Wall Phones, the wall telephones that have been designed and built as Wall Telephones by . . .

NORTH ELECTRIC COMPANY

553 SOUTH MARKET STREET • GALION, OHIO

"ALCOA BOOTH IN RESORT AREA EARNS $333 PER MONTH"

D. W. Busse of General Telephone Company of Wisconsin, reports

"We installed an Alcoa® Outdoor Booth in the heart of this vacationland late in the spring. At the end of the year, it had produced a total of $2,000 added revenue for us. In fact, we were so pleased with the original installation that we added the second Alcoa Booth late that summer. Even though many of the vacationers had headed for home, it boosted earnings at this location over 20%."

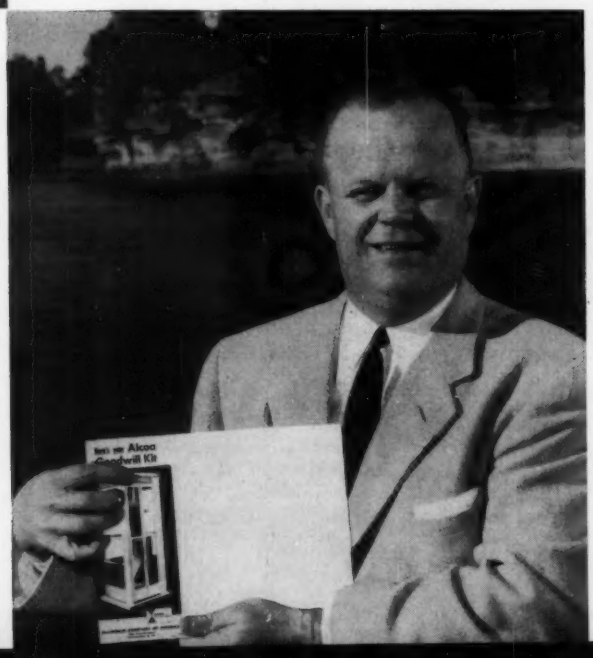
The General Telephone Company services this area with four outdoor aluminum booths. These Alcoa Booths are sturdy as well as attractive. They demand a minimum of attention—stay trouble-free, resist vandalism. Local residents and passing motorists all appreciate their convenience, their 24-hour availability.

"As a result of our excellent experience with these outdoor booths," says Manager Busse, "we plan to install three or four additional booths in this area."

D. W. Busse, General Commercial Manager of the General Telephone Company of Wisconsin, Madison, Wisconsin, standing near the Alcoa Booth installation at Wisconsin Dells. This famous vacation resort area, 55 miles north of Madison, is one of America's greatest scenic attractions. It stretches 12 miles along the Wisconsin River and includes, in addition to its beautiful rock formations, a pioneer village, ghost town, deer park, Winnebago Indian village and other interesting sights.

"LABOR INVOLVED? FOUR HOURS TO INSTALL," reports Mr. Busse. "Each booth comes in subassemblies, separately packaged. Our men just follow the detailed instructions. After assembly, only four hours is required for installation. Parts are interchangeable for easy replacement."

"OUR BUSINESS IS SERVING THE PUBLIC," says Mr. Busse. "We think the Alcoa Goodwill Kit is a perfect helping hand in letting our customers know how we're trying to serve them better." The Goodwill Kit contains ads, publicity releases, TV and radio commercials and bill enclosures printed in two colors on aluminum foil.



"MAINTENANCE? WE JUST WASH THEM," says General Commercial Manager Busse. "Pencil marks or grease smudges wipe right off. We'll never have to spend a cent for painting or rust removal with these Alcoa Booths."

SEND FOR FREE BROCHURE ON ALCOA BOOTHS. Contains complete information. And ask your jobber how Alcoa Outdoor Booths can increase your revenue—build community goodwill. Aluminum Company of America, 1690-B Alcoa Building, Pittsburgh 19, Pennsylvania.

ALCOA ALUMINUM TELEPHONE BOOTHS
ALUMINUM COMPANY OF AMERICA

Your Guide to the Best in Aluminum Value

"ALCOA THEATRE"
Exciting Adventure—Alternate Monday Evenings

the CCS per line equals the line limitations of the line finder group.

To convert call minutes to CCS, multiply the calls per minute by .6 (60 divided by 100).

The CCS divided by the number of calls, times 100 equals the holding time.

The calls times the holding time divided by 100 equals the CCS.

When engineering an automatic central office on the basis of manual central office records, the number of calls should be increased by 5 per cent, as more calls are attempted in an automatic system than in a manual system. The number of calls in a manual exchange is further increased by 1 per cent due to the assistance calls made in a dial system.

(Section 11 will be continued next week)

The Operator's Corner

By MAYME WORKMAN

EVERYONE ADMIRES a gracious person. There are such people in all walks of life. We find them at work, in our social contacts, boarding a bus, in church, and in practically any situation we might mention. A gracious person is not only admired, but usually has a host of friends.

Graciousness is a precious attribute and a passport to most of the things we yearn for — admiration, respect, love, and happiness. It is a mistake to think that one is born with it. It is an acquired trait, as readily acquired as the good manners which are a very important part of it.

Unlike most arts, one need not have a special talent for graciousness. Only the desire to be gracious—plus thoughtfulness and practice—is required. The key is the Golden Rule — applied so consistently that it becomes natural. It is a matter of treating others the way you would like to be treated, not because it is the diplomatic thing to do, but because you want to treat them that way.

The art of being gracious is developed by doing kind things—and sometimes difficult things—in the kindest way — until such behavior becomes characteristic of you.

To be gracious you must be cheerful. Cheerfulness is simply an attitude toward life. We all have our share of upsetting times when we must strive not to lose our head or loose our tongue. Successful people will tell you that one of the first requisites for getting ahead is the ability to make contacts and associations agreeably and harmoniously. The person who can control herself can control just about any situation. A cheerful person will out-distance any Gloomy Gus.

Life is no sofa pillow. It's a rough and rugged road for everybody. Everyone has troubles of one kind or another, but a light heart, like the springs on a car, softens the bumps and lessens the jar.

Sometimes it is necessary to mention an affliction to explain a situation as in the case of the minister who was dining at the home of one of his parishioners. He apologized for having his collar open, stating he had a boil on the back of his neck which became very painful when he buttoned his collar.

"But then," said the minister, "we must suffer patiently." The youngster in the house was listening carefully and said to the minister, "Well, if you want to suffer, why don't you button up your collar?"

When people complain about their troubles, they are adding to the troubles of others. We all have troubles and it takes a real friend with the patience of Job, to listen to the trials and tribulations of another person every time they come in contact with that person. There is also a time in most everyone's life when they need a confidant to help them over a rough spot, but this is a different situation which evokes a sympathetic attitude on the part of a friend.

One of the places where ungraciousness is most prevalent is in boarding a bus or a train. People who are generally polite lose all of their graciousness on such occasions, as they push and shove to be the first on board. Perhaps this is a hold-over from wartime when trains and buses were crowded beyond capacity.

Switchboard operators have many opportunities to be gracious, or vice versa, in their daily work, in dealing with customers, with operators on toll circuits, and in their own central office.

Graciousness on the part of an operator is effectively expressed by the tone of voice and the manner in which a call is answered. I have in mind a PBX operator whom I have occasion to call once in awhile. When she answers, it is just like a ray of sunshine entering the room.

Her voice has a pleasing quality, friendly, but not too friendly, leaving the impression, "I'm so glad you called. What can I do for you?" I hope her employer appreciates the value of her Voice With A Smile, which she acquired while working for the telephone company.

Being gracious not only makes life more pleasant for the people with whom we come into contact, it also makes our life more pleasant. It gives us that "inner glow" which can only be acquired by being gracious and kind to others.

Traffic Questions

(1) When should an "A" operator rewrite a ticket?

(2) Can an "A" operator change a ticket from one type to another?

(3) When an "A" operator rewrites a ticket, should the original be scratched?

(4) When does an "A" operator write a message rate ticket?

(5) When is an "A" board toll ticket written?

Answers are presented on page 64

Switching Circuits Program Offered By MIT In Summer

A special summer program on switching circuits will be offered by the Massachusetts Institute of Technology from June 17 through June 27.

This program is planned for engineers and research workers engaged in the development of equipment using switching circuits. No previous experience with the mathematical aspects of switching circuits will be required. Tuition for the course is $250.

Half the program will be devoted to lectures supplementing and amplifying the text book material. The rest of the time will be spent in discussion groups.

Lecture topics include switching algebra, algebraic treatment of contact networks, minimization methods, algebraic treatment of non-relay elements, including electron tubes, semiconductor devices and magnetic cores, multiple output networks, symmetric and iterative circuits, sequential circuit synthesis, pulsed circuits, and hazards in circuit synthesis.

The program will be under the supervision of Dr. Samuel H. Caldwell, professor of electrical engineering. For information on registration contact the Summer Session, Massachusetts Institute of Technology, Cambridge, Mass.

PHOTO-ELECTRIC RELAY

EXPERIMENTS with photo-electric devices were conducted by Alexander Graham Bell and Thomas Edison near the end of the last century. Since that time a large number of photo-electric devices have been invented and a wide range of applications has been found for them.

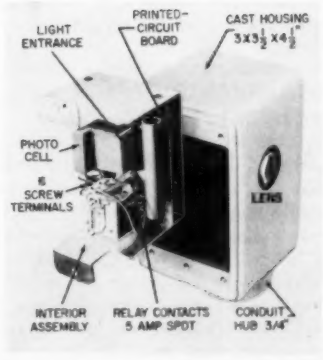
Perhaps one of the widest uses is that of the "electric eye" which scans a location or a machine and gives an electrical indication when some change takes place. This can range from such things as counting the number of people passing a doorway to detecting the presence of excessive smoke.

Many photo-electric devices developed in the past used currents which were less than one-millionth of an ampere. This low current often caused trouble because such tiny amounts may easily leak away.

Further amplifiers were usually necessary to bring this small current up into the milliampere range so that relays or other devices might be operated.

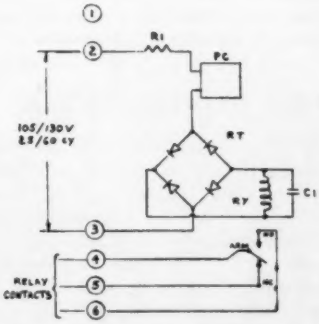
This method, in turn, had its problems, because as tubes would age the power delivered to the relay would change, and readjustments would be required if faulty operation was to be avoided.

The tide of technical development in semi-conductors has brought about a change in this situation by introducing a series of new crystalline substances which are efficiently influenced by light. One of these materials, cadmium sulphite, has made possible the development of photo-cells which will handle many milliamperes. This is sufficient for operation of relays without intervening amplifier stages.



The new printed-circuit photo-relay.

A photo-electric relay which uses a high output photo-cell is now being made by the Photobell Co. of 43 Vesey St., New York 7, N. Y. This device also uses a printed circuit board and is mounted on a chassis which will fit into a conventional conduit box. The circuit used is very simple. It consists of a photo-cell, a rectifier bridge, and a relay, which is connected across the 110-volt mains. The photo-cell and the ac power are connected across two arms of the rectifier bridge and the relay is connected across the other two arms.



Circuit diagram of a photo-electric relay. R1—resistor; PC—photo cell; RT—rectifier; RY—relay; C1—condenser.

This permits the relay to be operated from direct current, even though it is connected to the ac line. Optional circuit arrangements can cause the relay to operate with increasing light or with decreasing light. In addition, a timing feature is available which will delay the action by a few seconds if necessary.

In use, a photo-electric cell is usually connected so that a beam of light from some source falls upon the lens of the apparatus. This light causes current to flow through the photo-cell, which may be used to operate a relay. Thus, if placed next to a doorway, with a lamp on the other side, the circuit will trigger and ring a chime or operate a counter every time someone walks through the door interrupting the light beam. For short distances, any regular bulb will do for the light. Special spotlights are available which will cover distances up to 100 feet.

Telephone companies might find many uses for a device of this sort. Pointed at the sky it could turn on lights around buildings or pole yards when night falls. At an unattended dial office it could detect the presence of smoke or an intruder and sound an alarm at the building or at a remote location. It could sound a chime or tally a register every time a customer went in or out of a business office.

ELECTRONIC FILM

"NEW Dimensions in Electronics" is the title of a documentary film of electronic advancements at work throughout the world, which is be-

ing released by the Collins Radio Co. of Cedar Rapids, Ia. The 22-minute film shows the application of new electronic techniques in industry, transportation, and the armed forces. Semi-technical in nature, the 16mm sound film in full color documents many achievements in the fields of radio, communication, navigation, and control. If your company is interested in showing this film, write to the advertising department of Collins Radio.

MICROWAVE METER

A FREQUENCY meter which will measure microwaves from 250 to 1,000 megacycles with an accuracy of 0.2 per cent is available from the Polytechnic Research & Development Co. of 202 Tillary St., Brooklyn 1, N. Y. Known as the type 587A, the meter consists of an end loaded coaxial cavity resonator tuned by a plunger. A drum dial and precision screw mechanism are connected to the cavity plunger. The drum dial is spirally calibrated in units of frequency. Thus it may be tuned in a manner which resembles the adjustment of a micrometer. A circular describing this instrument is available from the manufacturer.

AUTOMATIC ANNOUNCERS

THE telephone industry is seeing an increasingly wide spread use of automatic announcers for giving intercepting service on disconnected lines, dead levels, etc. The devices used for these applications are usually especially designed automatic recorder announcers. Special circuits to adapt them to telephone use make them different from the conventional tape recorder.

An explanation of these devices and a complete circuit diagram is given in the December, 1957 issue of the *General Telephone Technical Journal*. A new version of automatic toll ticketing is also described in this issue. You can get a copy of this magazine by writing to Walter Axelsen, editor, General Telephone Laboratories, North Lake, Ill.

TRANSMISSION OBJECTIVE

LONG distance telephone service has improved to the point where people may now converse as if they were only 6 feet apart, according to W. K. MacAdam of the American Telephone & Telegraph Co. Thirty-five years ago transmission was such that the parties had to talk as though they were 70 to 80 feet apart.

MacAdam presented a paper before the winter general meeting of the American Institute of Electrical Engineers, in which he stressed that with service the main telephone product, its quality control is not a luxury but a business necessity. He suggested that the communications product be analyzed from the viewpoint of preference rather than tolerance. A knowledge of customer preference allows for a program of updating existing plant to modern requirements and is a deterrent to latching on to a physical measurement of noise, volume, and distortion and holding it sacred and unchanged throughout the years.

NEW DECIBEL METER

A NEW DBM/DBA meter designed especially for telephone test and maintenance applications is now available from the Consolidated Electro-dynamics Corp. Know as the model 11A, the new instrument measures signal and noise levels in the audio-frequency range. It has a sensitivity which permits measurements of as low as minus 80 dbm. It uses printed circuit wiring and low current transistors. It is powered by an internal supply of nine 1.3-volt mercury cells. It is thus completely portable and may be easily carried to locations where an ac operated instrument could not

Consolidated Electronics' new Model 11A DBM/DBA meter. Completely portable, it uses transistors and space-saving printed wiring.

be used. If you would like to know more about this test set, ask for CEC Bulletin 7002 from the Alectra Division, Consolidated Electro-dynamics Corp., 325 North Altadena Drive, Pasadena, Cal.

TV, TELEPHONE TRANSMISSION

STACKING television and telephone circuits together on one microwave system is feasible and economically attractive according to information presented by H. E. Curtis of the Bell Telephone Laboratories before the American Institute of Electrical Engineers. Along with officials of the Bell Telephone Co. of Canada, the speaker reviewed the TD-2 radio-relay system, which, when completed, this year will span Canada from Halifax to Victoria. The feasibility of stacking the two services was determined by a field experiment conducted by the Bell laboratories in 1954 on a 1133-mile route using standard television and telephone terminal equipment. The results indicated that two or three

telephone sub-groups of 60 channels each could be stacked in the 6 to 7 megacycle region above the television signal.

Experience gained to date with stacking on the Canadian system shows that the idea is attractive where the telephone circuit requirements are limited and system lengths range from about 200 to 1,000 miles.

MILLIMETER WAVES

COMMUNICATION systems are presenting a constantly increasing demand for circuits with great information handling capacities. This has resulted in a constant movement into the higher frequencies for radio and microwave channels.

The Bell System's TD-2 radio relay system uses frequencies around 4,000 megacycles, but higher frequencies are in order for new systems.

According to the *Bell Laboratories Record*, the wide use of radio systems sometimes gives the impression that the atmosphere is transparent to all frequencies. However, this is not the case, and severe attenuation can result as the frequency increases.

With the TJ microwave, which operates at 10,000 megacycles, attenuation caused by rain becomes an important consideration. This type of loss increases with frequency, until at 60,000 megacycles it can be as much as 20 db per mile for a moderately heavy rain. Fog also causes loss, but not as much as the rain, largely because fog does not place as much water in the air. Snow also has an effect, but less than rain.

At even higher frequencies, in the region of millimeter waves (30,000 to 300,000 mc), the effect of oxygen and water vapor becomes important even if it is not raining or snowing. Oxygen molecules in the air become resonant at mm wavelengths and absorb much of the energy. At 60,000 mc, this absorption from oxygen molecules is the same as that caused by rain, about 20 db per mile. The effect of the two together could seriously hamper communications.

Transmission losses of this type might be avoided by the use of wave guides, in which the atmosphere could be controlled as required.

The Bell laboratories have conducted a number of experiments to determine the propagation of millimeter waves in the atmosphere. The testing apparatus consisted of a plastic lens in a conical horn antenna which served for both transmitter and receiver.

The transmitted waves were reflected back by means of a reflector which was in the shape of the inside corner of a cube. This type of reflector sends a received wave back on itself, and is not too critical in alignment, according to the *Record*.

NEW CHARACTRON TUBE

A NEW electronic tube which will simultaneously display radar or TV images with identifying letters, numerals and symbols superimposed has been developed by the Stromberg-Carlson Division of General Dynamics Corp. for use in controlling air traffic.

The tube, called the Charactron Shaped Beam Tube, Type C19Q, is designed to aid in solving the increasingly complex problem of routing ever heavier air traffic in and out of the nation's air terminals, a company announcement said.

Because of its ability to show both aircraft and identifying symbols simultaneously, the tube will be vital in air traffic control operations, the company said, in emphasizing the tube is the ideal link between complex electronic systems and human controllers.

The new tube is an adaptation of the Charactron Shaped Beam Tube now in production by Stromberg-Carlson. This latter tube is a basic element of the SAGE system of air defense and has numerous other uses in the electronic display and data processing fields.

The C19Q tube uses the same signals as any other cathode ray tube in providing live radar displays, but in addition it uses the infinitesimal fraction of a second between radar pulses to form character displays as in the conventional Charactron Shaped Beam Tube.

TRANSISTOR RINGING GENERATOR

ANOTHER telephone use for transistors has been found in a multi-ringer developed by the Warren Mfg. Co., of Littleton, Mass. This device runs off of the central office battery and can supply a wide range of ringing frequencies and voltages. Ringing frequencies are generated by means of transistor oscillator networks which may be changed for harmonic, synchromonic and decimonic systems.

The same company has a float-rectifier for central office batteries which uses both transistors and silicon rectifiers.

ELECTRONIC COUNTERS

A DESCRIPTION of specialized counter tubes, including some typical circuit diagrams, is presented in the December issue of Sylvania News. These circuits show electronic means by which pulses can be stored and counted. Equipment like this may someday take the place of relays in telephone switching circuits.

You can get on the mailing for Sylvania News by writing to Syl-

vania Electric Products, Inc., 1100 Main St., Buffalo 9, N. Y.

MORSE CODE

IF YOU'RE thinking of learning the International Morse Code in order to get a radio license, you might be helped by Department of the Army Technical Manual TM 11-459. This 31-page book gives instructions for learning and practicing the code, and also includes some typing lessons. You can get it from the Superintendent of Documents, Washington 25, D. C. for 25 cents.

TRANSISTOR RELAY

A MICRO sensitive relay, which will operate on as little as two microwatts of power has been developed by the General Automatic Corp. of Mountain View, N. J. The relay uses a transistor to amplify the operating power. The transistor is contained in the relay case. A miniature battery for operation of the transistor can also be included in the case, or external power can be used.

MICROAMMETER

"CLAMP-ON" types of ammeters have long been used in the power field, but so far have seen little application in communications. The clamp-on instrument is a device resembling a pair of tongs, which can be clamped around a wire carrying current.

The magnetic effect of the current in the wire causes a reading on a meter, which tells the amount of current. These tools have been very useful in measuring currents of hundreds of amperes, without opening or disconnecting the load to connect the meter.

With large currents, the magnetic flux alone is enough to move the meter, but this would not be true with the currents found in communications. The National Bureau of Standards has developed a clamp-on instrument which will record 200 microamperes on its lowest range. The clamp-on portion is no larger than a clothespin and contains a tiny split-core transformer used as a pickup.

A transistor amplifier is used to bring the feeble current up to the point where it will operate a meter. The construction details and circuit diagram are given in the December, 1957 issue of the National Bureau of Standard's Technical News Bulletin. You can get a copy for 10 cents (or a dollar a year for a subscription) from the Superintendent of Documents, Washington 25, D. C.

MICROWAVE

AN INTERESTING explanation of microwave is included in the December issue of the Lenkurt "Demodulator." Klystron tubes and wave guides are simply explained, and illustrations are included which show the effect of path attenuation and fading. One such illustration shows what is meant by Fresnel zones and another shows how atmospheric diffraction may make the earths radius appear smaller or larger to microwaves.

You can get on the mailing list for the "Demodulator" by writing to Lenkurt Electric Co., San Carlos, Cal.

AUTOMATION

WE MAY all get a chance to become philosophers if machines can be made to take over our thinking in more mundane fields.

According to S. L. Seaton of Hampton, Va., the thinking machine should predominate in all fields and problems not involving judgment or moral and philosophical balances, and every means possible should be employed to eliminate humans from the operation of the machine and the data processing chain.

Speaking before the winter general meeting of the American Institute of Electrical Engineers, Mr. Seaton envisioned the machine as a tool which would give man the time and opportunity to develop his brain, "a most unusual instrument of elegant and yet unknown capacity," for "contemplation, moral judgments, exercise of advanced concepts, and the choosing of proper courses of action.

FREE POWER

THE idea of drawing free power from the air to operate transistors is becoming more popular. A number of circuits have been developed for powering electronic devices entirely from electro-magnetic energy radiated from distant sources. These sources may be transmitters operating specifically for powering the devices, or they may be regular radio or TV stations. Circuit arrangements have been developed for storing the dc power rectified from the air waves and withdrawing the power from storage as required.

A study of these various circuits, including complete instructions for building a standard broadcast radio receiver operating on this principle is included in a recent report issued by the Department of Commerce entitled, "Powering Transistorized Electronic Devices with Radiated Energy." The report may be obtained for 50 cents by ordering PB131264 from the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.

NEW DECODER

THE versatile Secode decoder, the gadget which brought one bell ringing to multi-party lines, is now available in a new model which is compatible with Bell System mobile telephone operating standards. This

model responds to 600-CPS and 1500-CPS tone pulses and is interchangeable with the Western Electric decoder units now in use in mobile telephone systems. The new decoder increases the capacity of mobile telephone systems from 4,000 possible five digit codes to over 55,000.

FREQUENCY MEASUREMENTS

IF YOUR plant contains any radio transmitters, such as in the mobile service, you may be required to make frequency measurements from time to time. An old standby for this purpose is the micrometer frequency meter manufactured by the Lampkin Laboratories Inc. of Bradenton, Fla. This meter will measure frequencies anywhere in the range of 100 kilocycles to 175 megacycles when operated with a separation of from 10 to 1000 feet of the transmitter.

The circuit of the micrometer frequency meter consists of a highly stable variable frequency calibrated RF oscillator, which covers a relatively narrow fundamental frequency range; a diode harmonic generator to increase harmonic strength; and an untuned wide frequency range audio detector to pick up beat notes between the meter and the transmitter to be measured.

The meter is, therefore, a heterodyne type. It is used to radiate a signal at or near the frequency to be measured. This frequency is received on the detector. The frequency from the transmitter to be measured is also received on the detector. If there is a difference between the two, a beat note will result. This will be heard from the detector as a tone or audible whine. When the frequency of the meter and the frequency of the transmitter are brought together, the beat note will decrease in frequency until "zero-beat" results.

One model of the frequency meter is standardized by comparing it with transmissions from station WWV. Another model contains its own internal quartz crystal calibrator. Features of the Lampkin meter include a micrometer condenser of cylinder and tube construction, a veeder counter, and a correction for crystal temperature errors by means of a scale engraved on a thermometer. You can get complete specifications of the micrometer frequency meter by writing to Lampkin Laboratories.

do you use Electronic Equipment?

microwave

mobile radio

carrier

repeaters

. . . do your men "understand" the "mental tools" of electronics? Can they be relied upon to keep your valuable electronic equipment in top condition?

The rapid advance of electronics in the telephone industry has created a serious problem. Thousands of competent telephone technicians have no sound understanding of the fundamental concepts . . . "the mental tools" . . . of electronics.

You can solve this problem quickly and economically and your men will never be away from their jobs. Resident training programs are good, but few independents can afford the cost and lost man hours.

Progressive telephone companies have found the answer in good fundamental training in our Employers' Plan. If it benefits them . . . it can benefit your Company. It will be well worth your while to get the details.

WRITE ON COMPANY LETTERHEAD FOR FREE BOOKLET

CLEVELAND INSTITUTE OF RADIO ELECTRONICS

4900 Euclid Ave., Desk TE-16 Cleveland 3, Ohio

IT TAKES ONLY *15 SECONDS*

This box contains a relay bar. This relay bar is the only equipment you need to add ten lines to a Leich Dial System.

Here it is — ready to be jacked-in to your Leich Dial System. No wiring or soldering.

Imagine this! It will cost you ONLY $175.00 to add ten lines to your Leich Dial System. It will take but 15 seconds to jack in this single, inexpensive relay bar which does the job. There's no wiring, no soldering, no engineering, no factory installers needed.

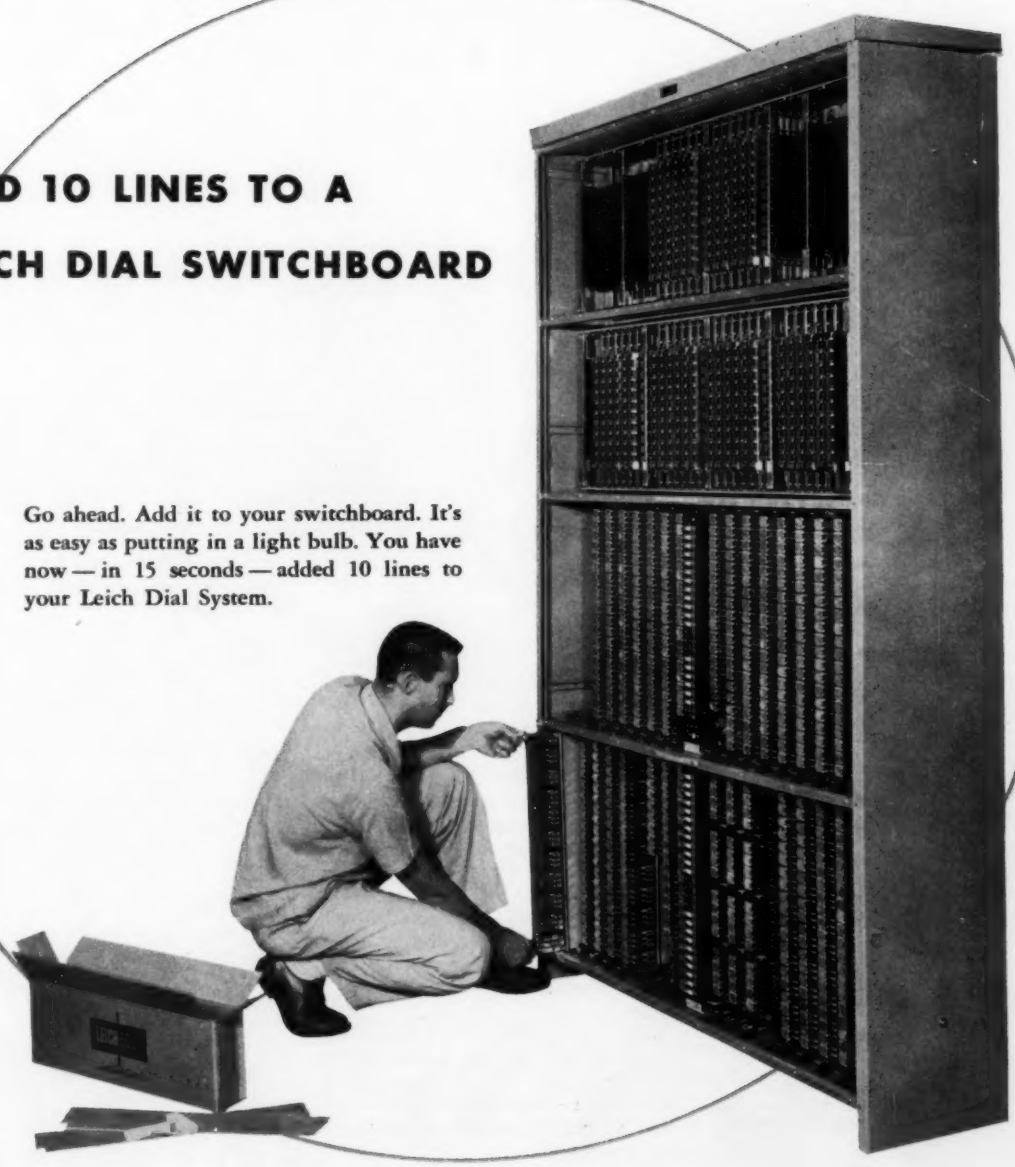
Check — see the time, trouble and expense involved in adding ten lines to other more complicated dial switchboards. Then call us — get the full story on why over 800 Leich Dial Systems are now in service.

Get the Leich story today.

LEICH

TO ADD 10 LINES TO A LEICH DIAL SWITCHBOARD

Go ahead. Add it to your switchboard. It's as easy as putting in a light bulb. You have now — in 15 seconds — added 10 lines to your Leich Dial System.



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manufacturers of telephones, switchboards and related apparatus since 1907

NEW DEVELOPMENTS

in Independent Telephony

By RAY BLAIN

THIS is the fourth article in a series of five, in which our technical editorial director describes various new items of equipment of interest to all progressive Independent telephone companies. The third article appeared in the Feb. 15 issue. Readers desiring more information on any of the products described may write to Mr. Blain in care of TELEPHONY.

* * *

Extendible Boom Derrick (Fig. 46). This is a two-legged derrick with an extendible boom-head. This extendible boom-head is a double acting cylinder which extends the derrick head an extra 5 feet. This feature permits the handling of longer poles than is possible with conventional derricks of the same size. The manufacturer lists the following features for this derrick: (1) Ability to lift heavy loads in low ranges, (2) body-loading up to 4,000 pounds, and (3) an operating range that permits the use of power feed attachments to force diggers into the ground.

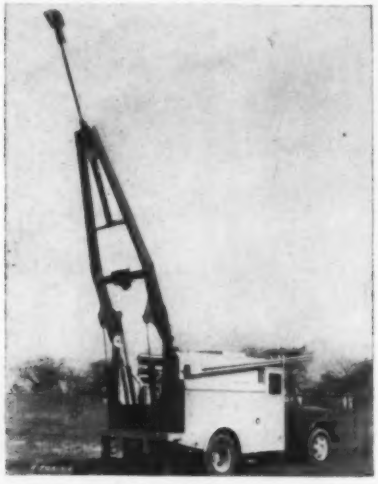


Fig. 46. Extendible boom derrick.

With the boom-head extended, this derrick handles poles up to 75 feet long, yet loses very little of its lifting capacity. For instance, in a position about 10 degrees beyond the vertical, the capacity without the boom-head extended is 8,000 pounds; with boom-head extended, the capacity is 6,000 pounds.

The handling of heavy loads in low ranges is made possible by the use of a four-cylinder arrangement for moving the side legs. Two single-acting cylinders (auxiliary lift cylinders) move the derrick within 10 degrees of vertical. Then, two double-acting cylinders (main lift cylinders) take over, giving greater leverage where it is needed.

Both sets of lift cylinders and the boom-head cylinder are guided by the three hydraulic control levers. These levers can be located wherever desired —on the rear, in a side compartment, or in the cab.

This derrick is completely hydraulic. It rises from overhead stowage position and swings over to within 5½ feet of the ground. This not only permits easy threading of the winch, but also permits the use of a digger power feed attachment. Thus, the hydraulic power and weight of the derrick can be used to force a digger into hard ground.

Fig. 47. Cable splicers' truck bodies.

Cable Splicer's Truck Bodies (Fig. 47). A new line of cable splicer's truck bodies are now available, ranging from a one-man combination unit to a two-man maintenance truck with an aerial ladder. The new features include a new rub rail that keeps water from dripping into the compartments, a new indented door handle and a stiffer,

(Please turn to page 42)

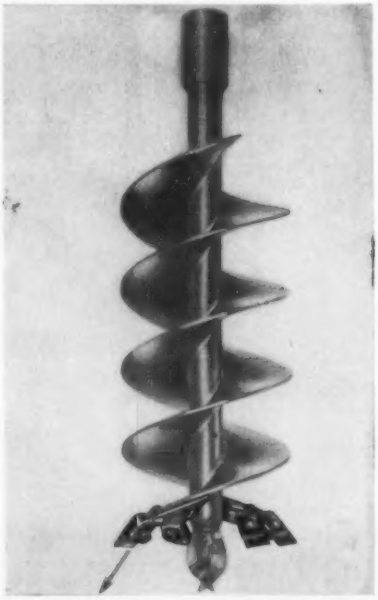
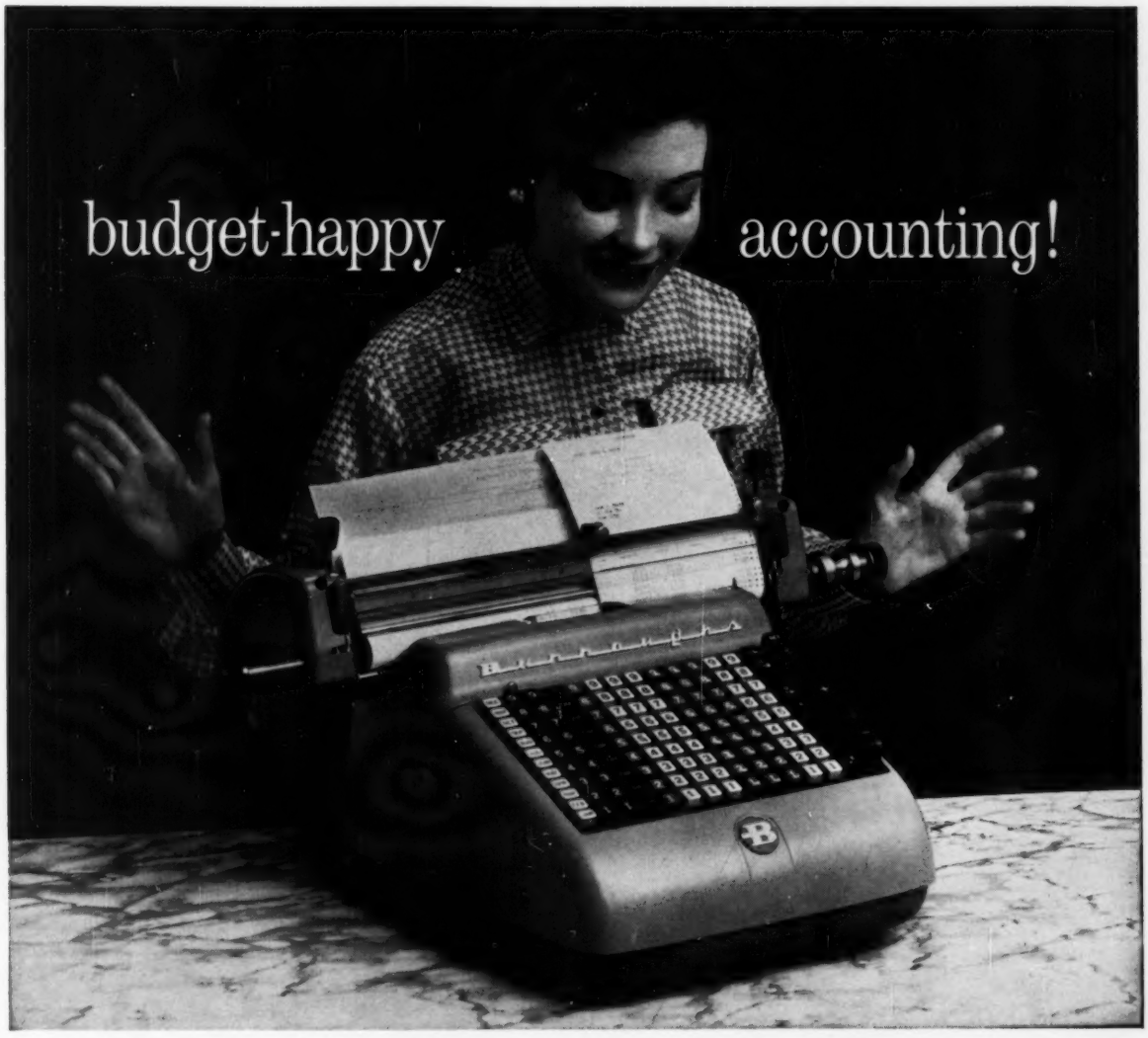


Fig. 48. Light-duty auger head assembly.



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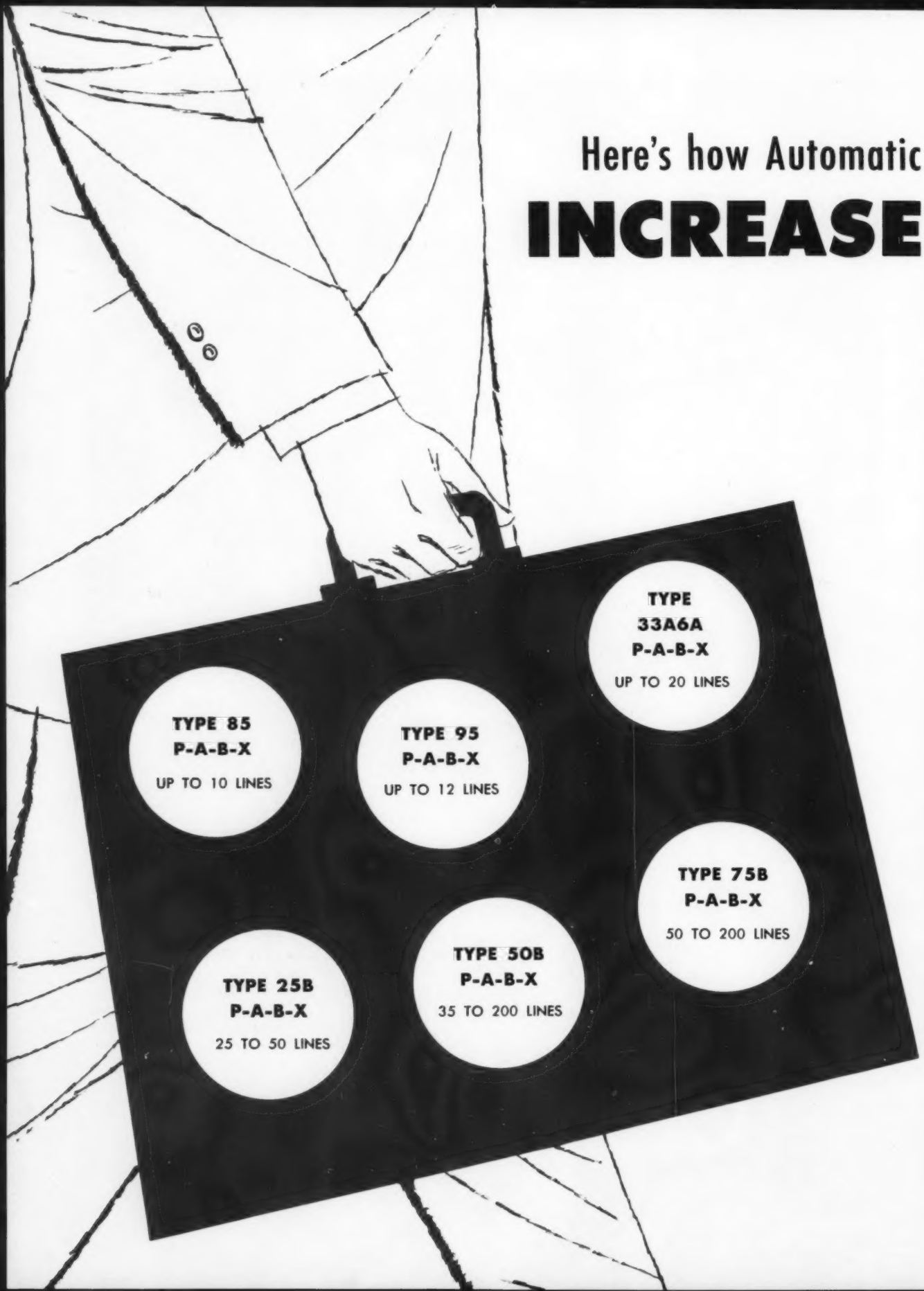

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stronger fender. All of these bodies are made of strong, rust-resistant high-tensile steel.

•

Light-Duty Auger Head Assembly (Fig. 48). This light duty auger head assembly makes use of the new penge quick change reversible wisdom tooth which provides double tooth life. When it wears, it may be turned over and is again as good as new. They are also equipped with the screw bit pilot. This replaceable pilot is of the fishtail design.

These assemblies are available for use on any make of single helix auger or double helix auger. They both make use of the same parts which are interchangeable between them and on all sizes from 6 inches to 24 inches in diameter.

•

Small self-propelled Trencher (Fig. 49). With the present trend toward underground wire and cable distribution systems, a small, lightweight trencher is in great demand. This trencher is

Fig. 49. Small self-propelled trencher.

small and compact and enables the operator to get between and around buildings easily, thus eliminating the necessity for much hand-digging.

This trencher will dig trenches three inches wide and up to 5½ feet deep; or, 4 inches wide and up to 3½ feet deep. In special cases it may be equipped to dig trenches 6 inches wide and up to 2½ feet deep.

Self-propelled, it drives on all four wheels while digging, and the rear wheels only while in transport gear. It weighs approximately 500 pounds. It is 38 inches wide, 42½ inches high and 60 inches in length when detachable boom is removed.

Back-up Safety Alarm (Fig. 50). This new mechanical back-up alarm for motor vehicles is a self-contained unit that is easily attached directly to the rear wheels. It operates by gravity only, and is independent of electrical circuits or the speedometer. The alarm is mounted outside on the left and

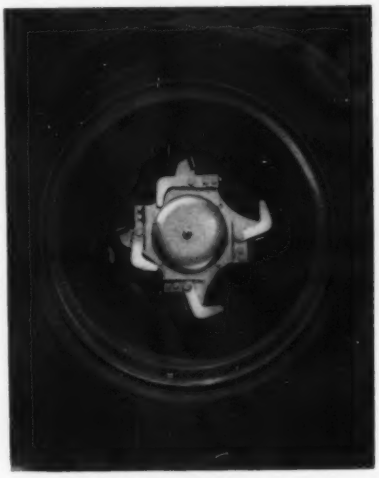


Fig. 50. Back-up safety alarm.

right rear wheels to insure a warning to anyone behind a vehicle. The alarm rings loud and clear only when the vehicle is in reverse. Rubber cushions eliminate noise in the forward motion. When the vehicle moves forward, the hammers fall against rubber stops and remain in that position by centrifugal force.

The alarm is a 6-inch metal bell mounted on a steel plate and is installed on the axle hub of wheeled vehicles. It is sounded by four heavy metal hammers striking the bell once every quarter revolution of the wheel when in reverse motion.

•

Truck Safety Stair (Fig. 51). The truck safety stair was designed to reduce accidents caused when men are getting in and out of trucks. Strained backs, sprained ankles, hernia, fatigue, are only a few of the problems which arise when men do not have adequate accessibility to the truck bed.

This truck stair has recently been redesigned to increase its adaptability to the latest model trucks. A new side latch, replacing the old spring steel snap latch, has been added to the left side of the stair. This provides positive engagement to insure holding the movable stair in a closed position when not in use. Even under extreme road shock conditions, the new latch—with its positive action—will not release.

The stair treads have been redesigned to minimize slippage in wet weather. Each tread is 6 inches deep.

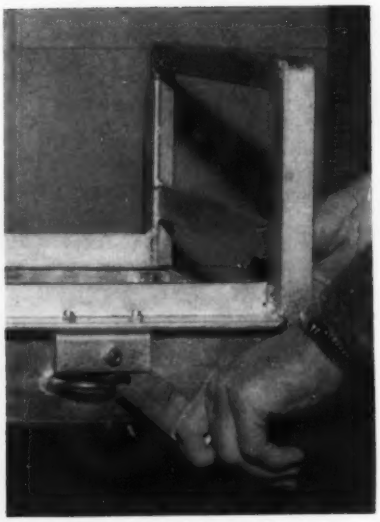


Fig. 51. Truck safety stair.

The stair is 34 inches long and 14 inches wide. It may be attached to the underside of the truck frame by four bolts, or welded in position. If the truck should be accidently backed into a loading dock when the stair is extended it automatically slides back under the truck, undamaged. The weight of the stair is 45 pounds.

•

Insulated Safety Link (Fig. 52). During the past two years, 20 men in the state of California alone have been killed from accidents caused by cranes and derricks contacting high voltage lines. This type of accident has become such a consistant killer that a number of states have passed legislation calling for the indictment of crane operators in such cases.

The new insulated safety link has been tested over a period of two years.

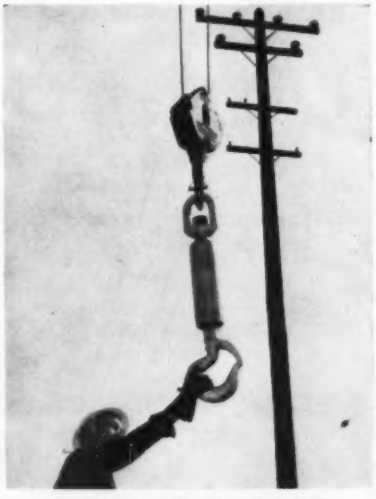
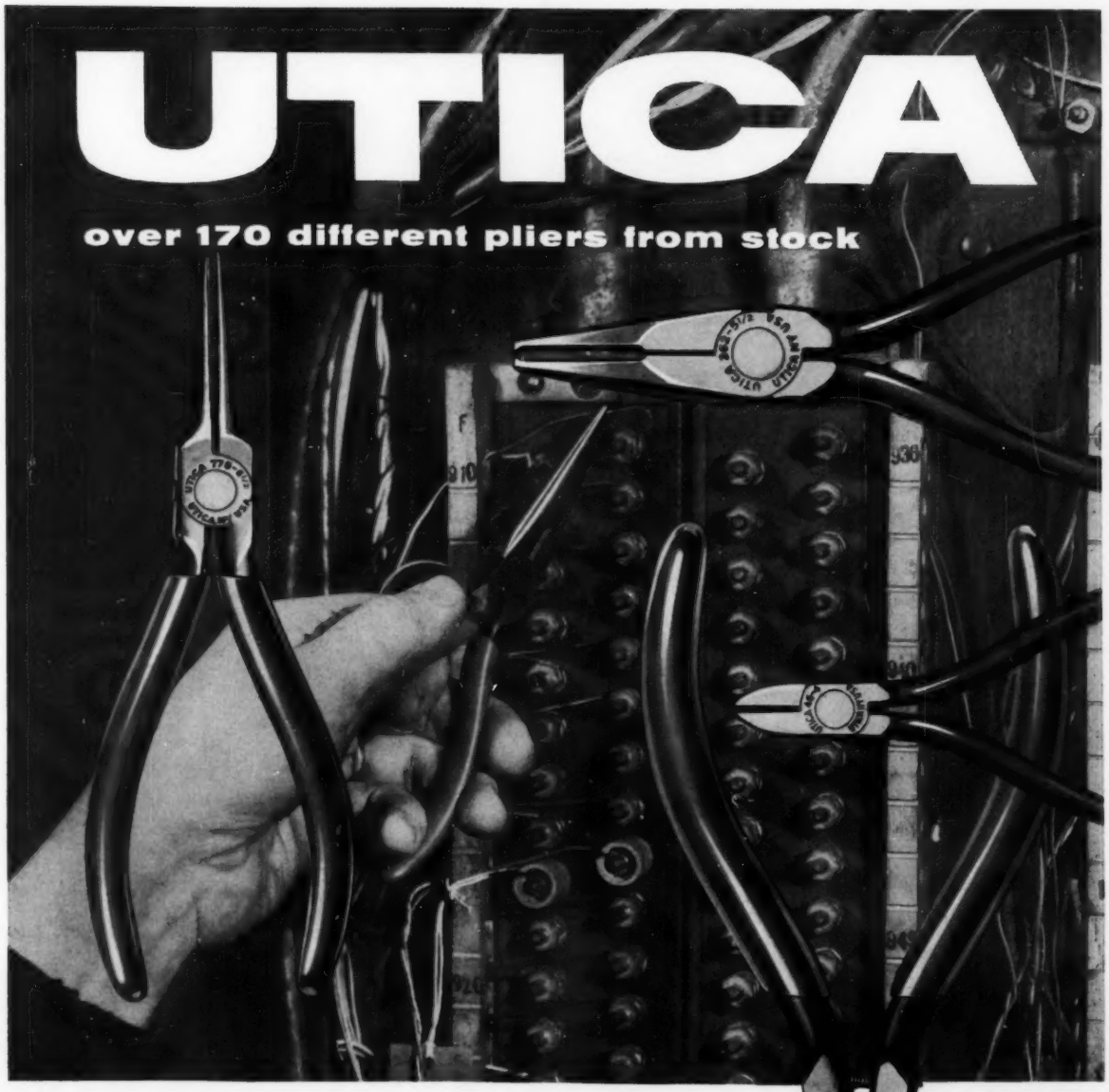


Fig. 52. Insulated safety link.



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It protects hook tenders, riggers and men working with cranes and derricks. The crane boom and hoisting cable may be energized as much as 50,000 volts without danger to men handling the hook or load.

There is no danger of reducing crane or hoist lifting capacity when the insulated safety link is used. All links are tested and rated at the same safe working loads as the hook they support. These safety links are manufactured in many sizes from one-half-ton to 25 tons with dialectric strength from 1 to 50 KV.

•

Ventilating Manhole Heater (Fig. 53). This heater was designed to give cable splicers, working in manholes, fresh air in summer time and heated fresh air for winter-time operation. It may also be used to advantage for drying out wet cables and manholes. A generator that is incorporated in the heater has a capacity of 160 watts, 115 volts dc at 1800 rpm. The complete unit weighs only 74 pounds.

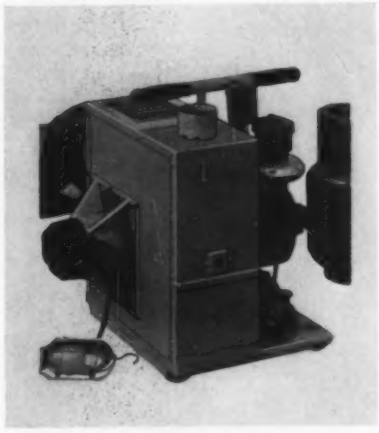


Fig. 53. Ventilating manhole heater.

Many operating companies are now adopting continuous forced-draft ventilation for their cable splicers working in manholes. It is a recognized fact that this ventilation makes a manhole a safer place in which to work. However, in cold weather the only way it is possible to induce a splicer to ventilate a manhole is to give him heated fresh air. The experiences of operating companies have indicated that the efficiency of their splicer has increased tremendously in winter when they have used heated fresh air ventilation. Also, with this type of ventilation, the splicers have suffered from fewer colds.

•

Emergency Generator Plants (Fig. 54). This item covers a new HC series of water-cooled, revolving armature 10 and 15 KW electric plants. These plants are available in either 10,000 or 15,000 watt ac size, ranging in voltages to 460 volts. Completely self-contained, these gasoline engine driven units will provide full-rate electric power for all types of standby emergency applications for telephone exchanges or other communication systems.

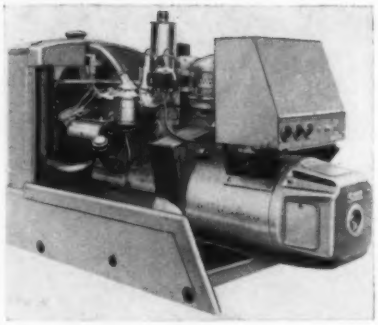


Fig. 54. Emergency generator plants.

Prime mover for these new electric plants is the heavy-duty 41 HP, Continental F-162 engine. Direct-connected to the all-climate generator, this four-cylinder, water-cooled engine operates on either gasoline or gaseous fuel. Standard features include radio suppression, leak-proof water pump, oil bath air cleaner, gear type oil pump, oil filter with replaceable cartridge, high water temperature cut-off and a 12-volt battery charging generator with the charge rate automatically regulated.

These electric plants are available with an optional weather-proof sheet-metal housing. For the unhoused models, these engine controls are standard equipment: Battery charge rate ammeter, electric water temperature gauge, electric oil pressure gauge, momentary start-stop switch, two-way ignition switch, electric and manual start, and output terminal block.

•

Wire-Wrap Tool (Fig. 55). During the past five years considerable information has been published on the solderless wrapper connection. Most of this has been on the part of the Western Electric Co. and the Bell Telephone Laboratories whose application and research has pointed out the merits of the connection. Since introduction of the first "wire-wrap" tools in 1952, it is estimated that over 700 million solderless wrapped connections have been made on telephone equipment, television sets, electric motors, appliances and automotive electrical equipment.

Fig. 55. Wire-tap tool.

This tool consistently wraps wire so tightly around a terminal that the connections meet the exacting electrical and mechanical requirements for a permanent high pressure connection. Six basic conditions between the wire and the terminal define these requirements as follows:

(1) Metal-to-metal contact with surfaces free from film or oxidation.

(2) High contact pressure.

(3) Gastight contact areas not subject to deterioration from weather or corrosion.

(4) Large contact areas equal to or greater than the cross-section area of the wire.

(5) Mechanical stability to prevent connections from breaking during assembly and handling operations.

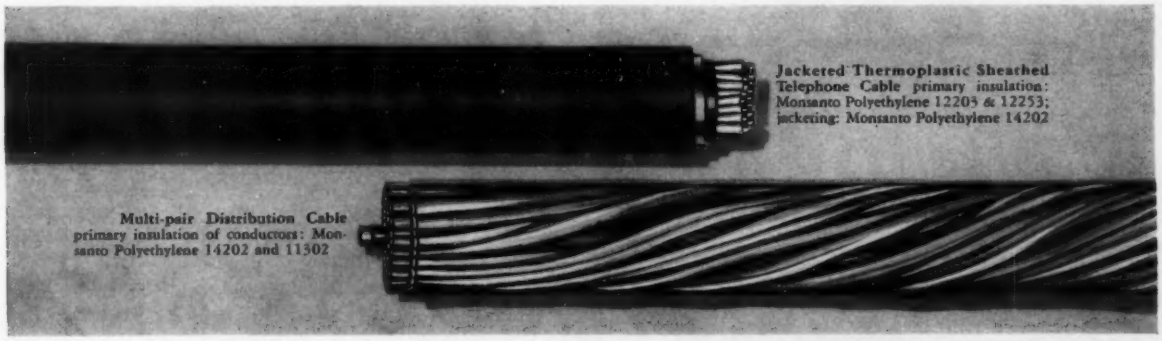
(6) No embrittlement or stress concentration.

Making the solderless wrapped connection is a simple operation. First, the end of the wire is skinned, the length depending upon the number of turns needed for the connection. For example, a six-turn connection made with 24-gauge wire requires approximately 1½ inches of wire. The skinned end of the wire is inserted into the wrapping bit of the wire-wrap tool, the bit is then placed over the terminal and the trigger squeezed. In a fraction of a second, the rotating wrapping bit winds the wire around the terminal to produce a permanent, tight-wrapped electrical connection.

Permanent solderless wrapped connections require a suitable relationship between the wire and the terminal. Generally, any terminal makes a reliable connection when it has one or more edges crosswise to the axis of the wire. The terminal must be small enough to fit into the wrapping bit yet large enough to withstand the stresses placed on it. Also, a small width-to-thickness ratio makes it easier to maintain tension in a wrapped wire. Copper, tinned and untinned brass, phosphor bronze and nickel-silver are typical materials for terminals successfully used in solderless wrapped connections. Wire-wrap tools use wrapping bits

(Please turn to page 48)

THE MESSAGE IS: MONSANTO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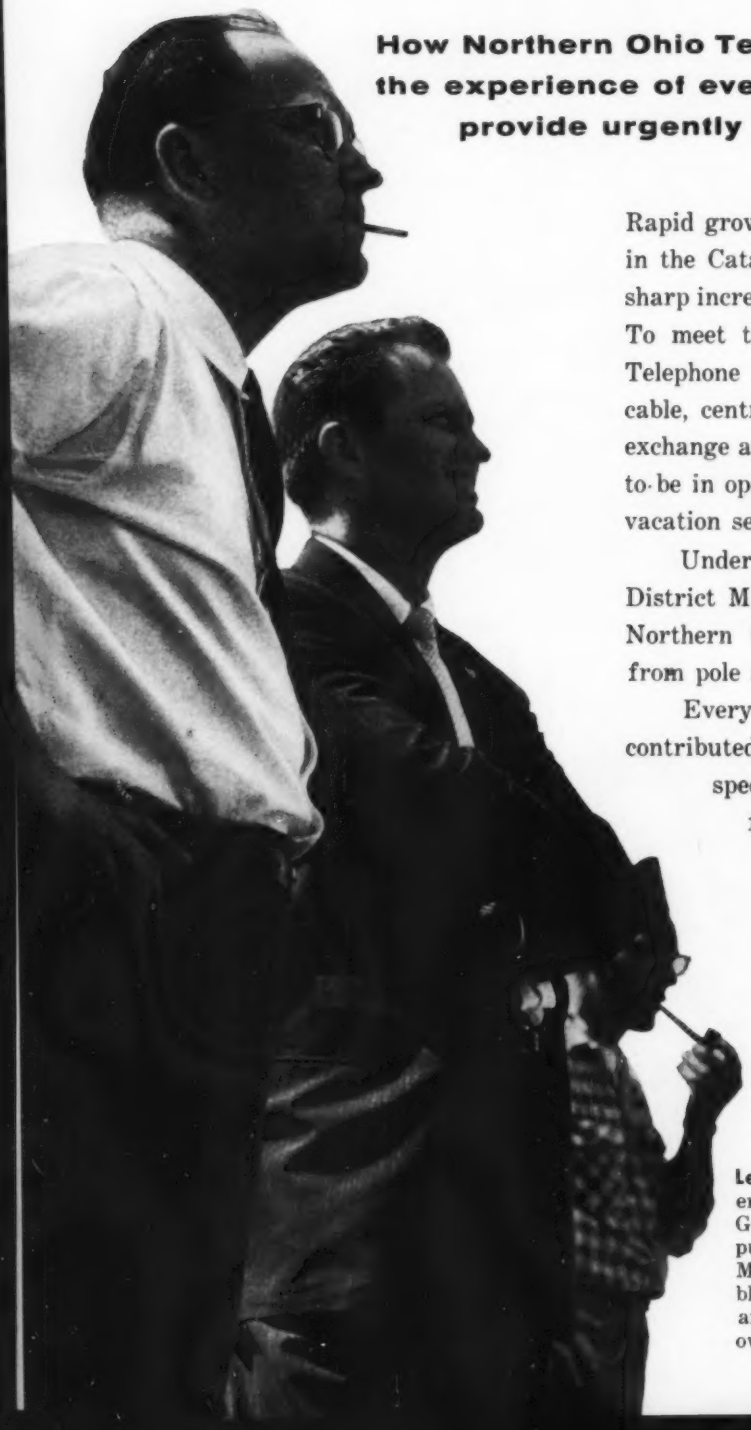
They met the "in-service" deadline at Catawba Island

How Northern Ohio Telephone Company used the experience of every man on their team to provide urgently needed service on time

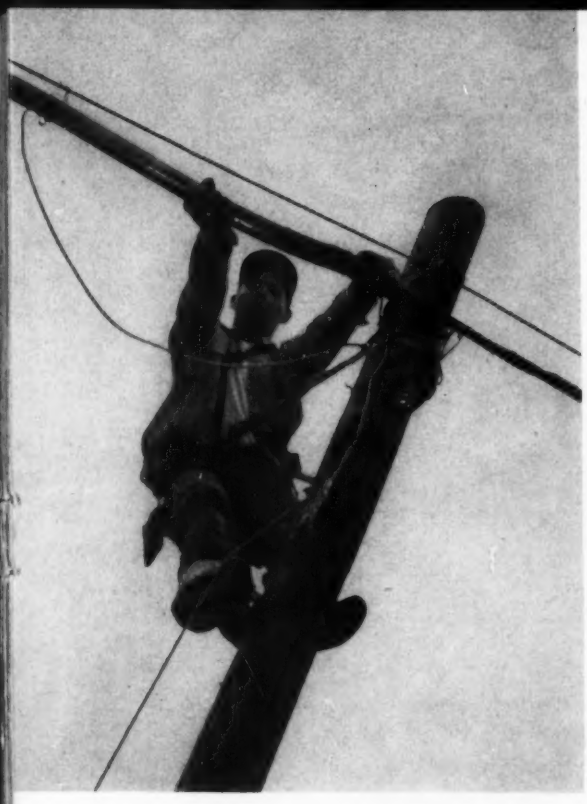


Rapid growth of the popular vacation country in the Catawba Island area of Ohio caused a sharp increase in the need for telephone service. To meet these new demands Northern Ohio Telephone rushed construction of pole lines, cable, central office equipment for a new sub-exchange at Catawba Island. The facilities had to be in operation before the start of the next vacation season.

Under the skilled direction of Jim Peltier, District Manager of the Port Clinton area of Northern Ohio each task was programmed, from pole setting to cable splicing.

Every man connected with this project contributed generously from his own skills and specialized experience. Result: the new facilities went into service on time.

Left, Jim Peltier, District Manager of Northern Ohio Telephone and George Ostrander, Graybar Telephone Specialist, watch the pulling in of new cable at Catawba Island. Mr. Peltier has designed and patented a block for pulling in rural distribution cable and enjoys the satisfaction of having his own invention speed up the work.



Above, Clayton Stager, lineman with Northern Ohio Telephone Company, guides a new 12-quad 19 gauge cable, plus 303 pair 19 gauge, supplied by Graybar, as it is pulled in.

Useful life in a telephone pole depends upon wide selection of wood and its treatment to resist weather and insects. Here William Nelson, (left), sales representative of International Creosoting & Construction Co., Warren Ritter, (right), Northern Ohio Purchasing Agent, and George Ostrander, (center), check up on one of the treated pine poles delivered by Graybar for this carefully programmed construction job.

And, speaking of key materials, William C. Henry, President of the Northern Ohio Telephone Co., has this to say about Graybar:

"In meeting rigid schedules on important construction projects as well as routine needs, we expect and require from our suppliers the best and newest in equipment and materials, plus on-time deliveries. Graybar people work as closely with us as the members of our own staff. We can always count on their cordial teamwork."

We at Graybar are proud to be on the construction and maintenance teams of Northern Ohio, and other great independent telephone companies across the nation. Graybar is wholly owned by its operating and retired personnel and, like you, we're proud of our own independent status. You'll get that extra bit of attention from friendly people, anxious to please. For anything electrical, from the top of the pole to the bottom of the hole, call Graybar *first.*

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Call Graybar first for... Graybar Quality Everything Electrical

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IN OVER 130 PRINCIPAL CITIES

adaptable to wire sizes varying from 14-gauge through 26-gauge.

•

Measuring Wheel (Fig. 56). Accurate measurements can now be made conveniently from a moving vehicle with a measuring wheel with extended handle. The specially designed handle enables the driver to guide the measuring wheel with ease while operating

Fig. 56. Measuring wheel.

the car at a moderate speed. This feature is especially useful for taking long distance measurements, which, on foot, is impracticable or inconvenient. The complete unit is sturdily constructed and finely balanced, permitting the driver to guide the wheel with minimum of effort.

The scientifically calibrated wheel and special counting mechanism assure accurate measurements which are recorded in feet automatically up to a distance of nearly 19 miles. A special stand arrangement enables the driver to park the measuring wheel in an upright position without leaving the car.

•

Cable Tester (Fig. 57). This new method of cable testing requires a change in practice. The primary purpose of this tester is to monitor cable pairs electrically. Further developments, however, have proved that it is practicable for many other uses. Telephone circuits are probably the only electrical circuits that differ when they are in use or are idle. A telephone circuit when idle has all the voltage on one side, but the instant the receiver is lifted the voltage splits, approximately equal on both sides, depending on the type of equipment.

Fig. 57. Cable tester.

This new instrument can test a line, busy or idle, without interrupting service. Further, it eliminates the need of a head receiver to listen in on a private telephone conversation to determine whether or not the line is in use. It indicates instantly whether a line is busy or idle on a visual meter. When a splicer is making a cable throw and testing is required to avoid cutting off a busy line, the test clip is connected to one side of the line. If the line is idle, the meter reads 48 volts. But, if the line is in use, the meter reads 24 volts.

The tester is basically a 1,000 ohm-per-volt voltmeter with a scale 0 to 60, or a total resistance of 60,000. One side of this meter is grounded and the other side is connected to a regular transfer clip to which is also connected a two-way switch. Due to the high resistance of the meter, it causes no trouble on the line.

•

Cable Breakdown Transformer (Fig. 58). This breakdown transformer is designed for use in clearing high resistance faults in cable or for burning a pair short so that it can be located by bridge methods or tone pick up. When connected to 110-volt, 60-cycle supply it provides up to approximately 700 volts at the test probes. Taps are provided in the secondary circuit to make available increasing potentials as desired or necessary, namely, 350, 500, and 700 volts.

Fig. 58. Cable breakdown transformer.

This voltage when applied across a cable pair, which is partially shorted, may clear the fault if it is caused by moisture or some slight imperfection in the insulation; or, this voltage may cause the pair to burn together so that a direct short results at the location of the trouble. If the pair burns short, the problem of locating the fault is simplified. The same treatment may be applied to a conductor which has become partially grounded to the cable sheath, or one which has developed a high resistance leak to a conductor in adjacent pair.

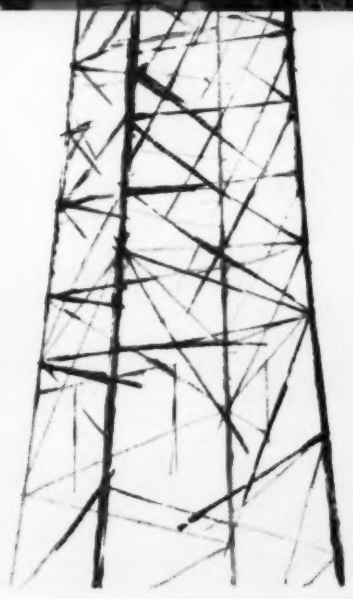
•

Pliers of New Design (Figs. 59, 60 and 61). This new plier design *(Fig. 59)* is based on an original principle which assures clean, fast cutting. The shear action makes it possible to cut hard wire or dead soft wire easily and quickly. The reverse side of the plier has a milled section behind the knife so designed that when the wire is cut it is held in position and a turn of the hand forms a 3/16-inch hook at the proper angle for connecting to a terminal. Without changing pliers, this hook may then be closed on the terminal for soldering. The shear blade is held in place with a countersunk setscrew and may be quickly replaced when the knife becomes dull.

(Please turn to page 70)

Microwave comes to Dallas on a Blaw-Knox Tower

Building in a crowded downtown location required a special self-supporting tower. This Blaw-Knox tower was built to withstand high winds common to the area.



Designed for future expansion, this 250 foot tower is equipped with ring mounts that permit precision orientation . . . allow additional dishes to be installed with less work and less cost.

Keeping pace with the times, the General Telephone Company of the Southwest turns to microwave to extend service, simplify future growth and lower circuit costs. In bringing microwave service to 16,000 of its 250,000 telephones, this progressive company relies on Blaw-Knox towers.

From Texas to North Carolina, from Florida to Ohio, these efficient microwave towers are paying off in the nation's most modern communication systems. Backed by over 40 years of tower experience, Blaw-Knox designs to *established* specifications, builds to meet *individual* requirements. By consulting skilled Blaw-Knox engineers you are assured of towers that best meet your present needs and can allow for future expansion.

Blaw-Knox's Microwave Tower Booklet covers the outstanding operating advantages of microwave, and outlines a complete service that ranges from tower design through fabrication and erection. Write for Booklet 2538 today.

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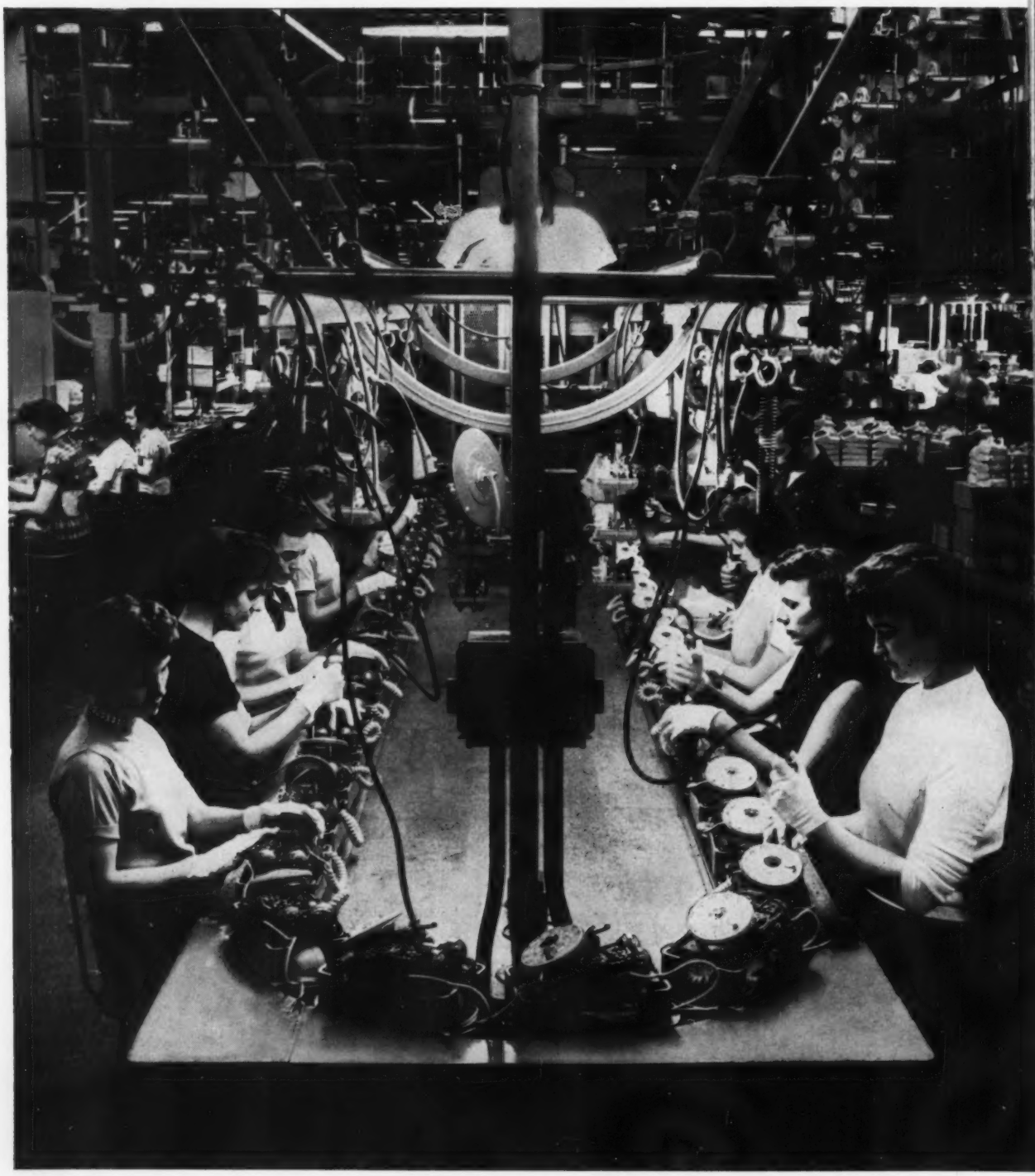


TELEPHONE TEAMWORK. At Western Electric's Indianapolis Works, these girls handle the final assembly of telephone sets. A 2½-mile-long conveyor system links the various manufacturing steps, bringing components and sub-assemblies from every corner of the plant.

INDIANAPOLIS, IND.

Capital city of Hoosier-land—and home of the "500-mile" auto race — this market town and industrial center has been the telephone "Capital" of the U.S. for ten years. Here Western Electric makes telephone sets for the Bell System—and produces a host of home-grown community benefits in the process.

Indianapolis is a small town grown big. Yet much of the small town lives on — in the spirit of the friendly people who have sparked its progress from the start.

These are the people who have sparked *our* progress at Western Electric since we came to town in 1948. Last year our big plant on Shadeland Avenue turned out 6½ million Bell telephone sets—thanks to the more than 6,000 Indianapolis people who are helping with our job as the manufacturing and supply unit of the Bell System.

As important as the telephones we make are the benefits our work helps provide. Besides jobs for our own employees, our purchases from 716 local suppliers help to extend these benefits to thousands of other men and women in the Indianapolis area. (These local companies, incidentally, are part of our statewide supplier team of 2350 firms.)

Actually, our activities affect nearly everybody in town. Local merchants, through our payrolls. City government, from the taxes we pay. Civic and social life, through the participation of our employees.

In Indianapolis, these economic and social contributions are an important part of our job.

Besides Indianapolis, Western Electric has factories in 25 other cities where we also make telephone equipment for the Bell System. Last year we purchased 1¼ billion dollars worth of raw materials, products and services from our nearly 33,000 suppliers located in every state. Of these, 90% are "small businesses." The things we make and buy are distributed to the Bell telephone companies through Western Electric distribution centers in 32 different cities.

Western Electric

MANUFACTURING AND SUPPLY UNIT OF THE BELL SYSTEM

SPEEDWAY MUSEUM at the Indianapolis "500" track houses famous racing cars, mementoes of past Memorial Day events. Jack Pursel (left) of Western Electric, a native Hoosier, talks with the museum's manager.

TELEPHONE BOXES by the millions are made for W.E. by Inland Container Corp., one of many local W.E. suppliers. Here, Inland sales manager, E. M. Huxford (right) talks with Western Electric's Ken Martin.

ON STAGE at the Indianapolis Civic Theater, Western Electric employee John Benedix (foreground) and wife huddle with the director. John is typical of the many W.E. employees who are active in the city's cultural life.

JUNIOR ACHIEVEMENT company sponsored by W.E. makes and sells telephone table lamps. W.E.'s Art Rehn (center), one of the company's advisors, is typical of our workers who support valuable youth projects.

THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

WE HEAR A LOT these days concerning toll circuit utilization and reduction of holding time. We cannot help but wonder, however, why toll operators, when placing a call to a distant PBX operator will invariably say: "I have a long distance call from Chicago for Mr. Blank." The PBX operator will then ask: "Are you paid?" The answer will invariably be "Yes" because if it is a collect call, the calling operator will so indicate in all cases.

What we have never been able to understand is why the toll operator doesn't state in the first place that she has a paid long distance call from Chicago for Mr. Blank and be done with it. The addition of the one little word "paid" to the phrase would save much lost time and confusion.

•

Miniaturized transformers for handling a wide range of audio and carrier frequencies, and designed especially for mounting on printed wiring boards, are now being produced by Stromberg-Carlson.

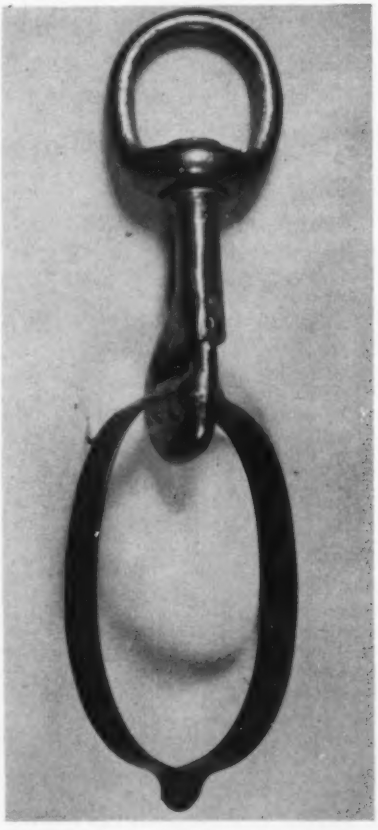
The core structures of these new transformers are nickel-iron laminations for the audio frequency units and ferrite for those to be used in the carrier frequency ranges. The windings are of polyurethane-insulated copper wire, and are separated by Mylar.

The cases are made of injection-molded phenolic in two sizes: 1⅛ inch x ⅝ inch x ¾ inch, and 1⅛ inch x ⅝ inch x 1⅛ inch. After assembly, the units are filled with an epoxy casting resin. This construction provides excellent performance under extreme humidity and temperature conditions.

•

Stanley Pierce, of International Falls, Minn., read in the paper about a lineman who tied a drop wire to his belt and started to climb a pole. The wire was drawn up across the road and a car, passing at high speed, struck the wire and pulled the lineman off the pole, killing him instantly. This appeared to be an avoidable accident, so Pierce decided to do something about it.

He fashioned a device from a harness snap and a spring bicycle pants guard as shown in the accompanying photo-



graph. This device is attached to the lineman's belt and the wire either tied to the spring or merely run through it for carrying up the pole.

If anything should catch the wire and give it a pull, the spring would release the wire without causing injury to the lineman. The spring for the service model should be heavier and stronger than the one shown in the picture. This device can be used equally well with either bare or drop wire.

•

Our long-time friend, Joe Kennedy, of Graybar Electric Co. in Washington, D. C., recently gave the writer a demonstration of stereophonic sound that we shall long remember as the most realistic sound we have ever heard.

This sound is recorded on two channels of the magnetic tape. These channels are then both played back through their own amplifiers and speakers. The two speakers are separated from 6 to 8 feet. This adds depth and movement to the music you hear. The various instruments can be located without difficulty—far or near, or from either side as you listen.

•

In some sections of the country, motels are now installing signs along the main traveled highways with lighted "Vacancy" and "No Vacancy" indicators. These signs are usually located about 10 miles from the motel. The lighted indicators are controlled by a relay that is operated over a cable pair from the motel.

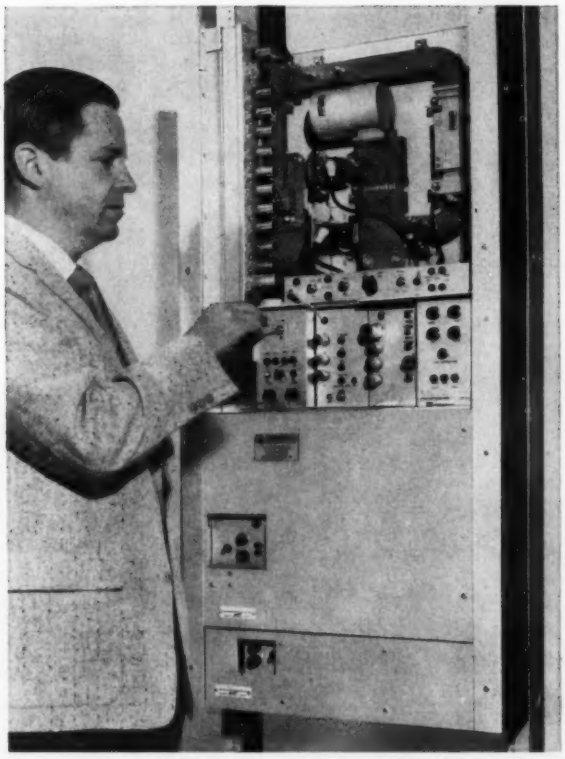
•

Tape recorders serve many useful purposes, even though the controls of some are rather complicated and difficult to use.

One model, recently placed on the market, solves this problem as it is equipped with five pushbuttons for stop, forward, rewind, play and record. These are conveniently grouped for easy use. The record and play buttons are interlocked to preclude accidental erasing. Furthermore, the over-all frequency response of this recorder is 50 to 13,000 cps at 7½ ips.

Expand toll circuits this fast economical way—

microtel



Basic terminal of Microtel equipment consists of transmitter, receiver, and power supplies.

NEW LENKURT microwave system designed for telephone use

Microtel Type 74A equipment operates in the 5925-6425 mc common carrier band. This new system is clean in design, highly reliable, and so flexible it meets the needs of telephone companies of all sizes.

In its simplest form, a Microtel terminal consists of a microwave-frequency waveguide assembly, intermediate-frequency amplifier, four plug-in units for input and output circuits, power distribution, and alarms and system supervision. All plug-in units are similar to Lenkurt's 45-class equipment, simplifying routine maintenance and inspection.

Like Lenkurt 45-class carrier equipment, Microtel is easy to expand. A system installed initially with only a few carrier channels, can be expanded economically to a high-density inter-city system. With 8 transmitters and receivers operating over a common path, a system can handle up to 1920 voice channels, plus 128 or more supervisory, remote control, or telemetering channels.

FEATURES:

- ***Power options***—Operates from standard office battery supplies or from 115-volt a-c mains.
- ***Ease of installation***—Standard 19-inch rack mounting; compact plug-in construction; space saving, back-to-back installations.
- ***Ease of maintenance***—Components accessible from front; built-in test facilities.
- ***Standby flexibility***—Frequency diversity or space diversity; combining or transfer facilities.
- ***Economical expansion***—With r-f circulators, 2, 3, or 4 terminals can be added to same antenna system.
- ***System length***—Up to 300 miles with medium loading and multiple repeater points.
- ***Repeaters***—Back-to-back terminal equipment permits dropping and reinserting of channel groups; automatic switching permits unattended operation.

New, *illustrated booklet includes Microtel technical summary, application ideas, additional helpful information. Phone Fillmore 5-7111, or write today for your copy. Automatic Electric Sales Corporation, Northlake, Illinois. In Canada: Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto. Offices in principal cities.*

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A member of the General Telephone System—
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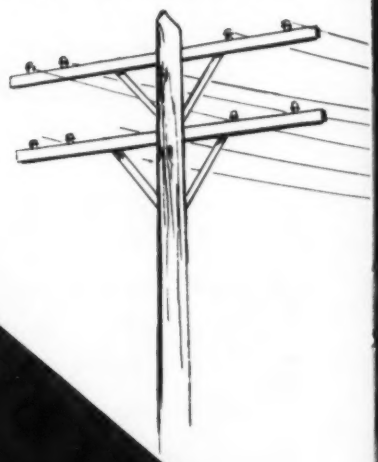
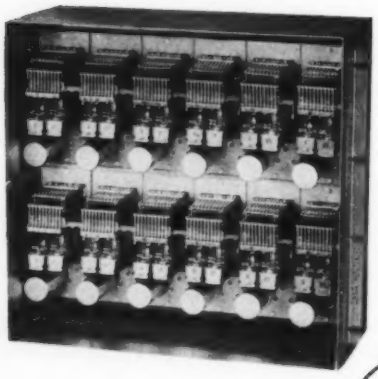
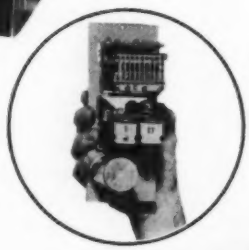
For *Modern* Party Line Operation →



Typical relay case
for Ringing Converter





Relative size of
unit assembly of
Ringing Converter

The UNIVERSAL
Code-to-Selective Ringing
Converter employs
simple circuits with the
magnetic impulse counter,
together with other
standard relay apparatus
of recognized
manufacture.

Other UNIVERSAL Telephone Equipment:
UNIVERSAL COMPUTER INTERCEPT
DIGIT ABSORBER for 2-5 Numbering

INDEPENDENT

"EASY TO INSTALL" UNIVERSAL RINGING CONVERTER!*

MODERN SERVICE DEMANDS SELECTIVE RINGING

Selective ringing has become a "must" to maintain customer relations, but the cost of modification of earlier dial units to full selective ringing is often excessive . . . in material, engineering and especially for the installation. The UNIVERSAL Code-to-Selective Ringing Converter unit is a simple applique circuit which places the majority of the wiring modification on a factory basis, thus reducing the installation time to a minimum. Most installations can be performed by maintenance personnel. Your company will benefit from increased revenue that can be expected with selective ringing because of increased station rates and increased party line fill.

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4501 TRUMAN ROAD
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1555 WEST FOURTH STREET
MANSFIELD, OHIO

23 BRODERICK ROAD
BURLINGAME, CALIF.

1594 SOUTHLAND CIRCLE, N. W.
ATLANTA, GA.

6100 EXCELSIOR BLVD.
MINNEAPOLIS 16, MINN.

165 PROSPECT STREET
PASSAIC, N. J.

*Pat. Pend.

Mail this coupon to the nearest address.

Gentlemen: I am interested in your Universal RINGING CONVERTER

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T-2-22

Courts and Commissions

Indiana Telephone Corp. To Appeal Rate Rescission

The Indiana Telephone Corp., Seymour, on Jan. 30 filed notice it would appeal to the Indiana Appellate Court an Indiana Public Service Commission order rescinding a rate increase granted a year ago and directing the company to refund an estimated $500,000 to $600,000 to its 23,000 subscribers (TELEPHONY, Feb. 8, p. 30).

The commission, in its order of Jan. 24, ruled that the rate increase had not been based on a proper valuation of the company's properties. A proper valuation, the commission stated, would have reflected the separation of investment and revenue for interstate and intrastate operations, as well as a separation between local exchange service and intrastate toll service.

The rate increase was designed to raise operating revenues of the utility by $744,000 a year. It took effect Feb. 1, 1957, in most exchanges.

Also on Jan. 30 the company asked for dismissal of a petition it had on file for authority to convert its Madison exchange to automatic operation at a cost of $602,750.

The motion for dismissal of the dial service conversion petition said that in view of present circumstances "it has become apparent that the petitioner cannot at this time finance the capital expenditures contemplated in the petition."

Claude M. Warren, Indianapolis lawyer representing the company, said the company will continue to charge the higher rates granted Jan. 11, 1957, and will not make any refund until it has exhausted all legal remedies against the Jan. 24 commission order cancelling the rate increase and directing the refund.

Wins Injunction in Tenn. Nonpayment Suit

Inter-Mountain Telephone Co., Bristol, Tenn., was granted an injunction on Jan. 23 restraining J. L. Stern, Bristol, Tenn. attorney, from further proceedings against the company in a $50,000 damage suit. The injunction was granted by U. S. District Judge Leslie R. Darr.

The dispute between Stern and the company began when the company interrupted Stern's telephone service because the company claimed he refused to pay a small bill from May 16 to June 15, 1952.

In answering the suit, Inter-Mountain Telephone Co. pointed out that, under a tariff on file with the Tennessee Public Service Commission, it is empowered to charge customers in advance for service.

Stern did not pay the bill when the statement was rendered and is said to have ignored a notice that service would be interrupted unless settlement was made by a specific date. Stern claimed the company held enough of his money, in advance payments, to liquidate the unpaid account. He charged that the action in interrupting his service damaged his "credit and character" and that the action had been taken "without just cause."

In a motion to stay the proceedings against it, the Inter-Mountain company stated that Stern had filed the action four different times. The suit was dismissed by the same district court in which the injunction was granted and the U. S. Sixth Circuit Court of Appeals sustained the dismissal, the company pointed out.

Another suit had been brought by Stern in Washington County, Va., in which he sought $50,000. Stern appeared on Jan. 22 before the Virginia court and asked for an injunction to restrain Judge Darr from staying the case before him. This motion was denied.

The Inter-Mountain company charged that Stern's many suits against it were "unconscionable, vexatious, harassing, expensive, and oppressive."

Requests Illinois Rate Raise

The Casey, Toledo & Neoga Telephone Co. of Casey, asked the Illinois Commerce Commission to approve a $55,000 annual rate increase, it was reported on Feb. 5. The company serves 4,800 subscribers.

Authorize Two Financing, Two Rate Pleas in Illinois

Rate increases for two companies and stock issues for two others have been approved by the Illinois Commerce Commission.

General Telephone Co. of Illinois, Springfield, on Jan. 22 secured permission to sell 353,000 shares of no par common stock (stated value: $15), aggregating $5,295,000, to General Telephone Corp. Purpose of the issue is to reimburse the company for costs of acquiring property, or for construction, extension, or improvement of facilities prior to Dec. 1, 1957.

The Okaw Commercial Telephone Co., Okawville, recently gained authority to sell 750 shares of $100 par 5 per cent cumulative preferred stock, amounting to $75,000. Proceeds of the sale are to be used, the company stated, for refunding prior obligations or acquisition of property, or for construction, extension, or improvement of facilities.

A 3 per cent return on a plant fair value of $42,000 recently was allowed the Farmers Telephone Co. of Lee County, Franklin Grove (TELEPHONY, Sept. 7, p. 38). The increase in rates amounts to $1,754.73. The fair value figure was arrived at by taking 120 per cent of net original cost.

Mulberry Grove Telephone Co. was granted a $4,144.55 rate increase designed to produce a 5.7 per cent return on the company's $114,273 rate base (TELEPHONY, Nov. 30, p. 55). Net original cost plus an allowance for cash working capital, material and supplies were used to obtain the rate base.

General of California Seeks OK On Bond Issue

General Telephone Co. of California applied to the California Public Utilities Commission for authority to issue and sell 20 million dollars worth of first mortgage bonds, it was reported on Feb. 4. The bonds will be due on March 1, 1988.

The issue will be sold at competitive bidding on March 12, it was announced by Edwin M. Blakeslee, president.

Funds from the issue, part of 60 million dollars General of California expects to raise in 1958, would be used for construction, Mr. Blakeslee said.

New England T&T Gets Rate Increase in Mass.

An $11,873,000 increase in rates for the subscribers of the New England Telephone & Telegraph Co., which went into effect Jan. 31, was approved by the Massachusetts Public Utilities Commission. The commission granted the company that part of a total of $18,600,000 which the company sought in petitions filed 10 months ago (TELEPHONY, Apr. 27, p. 72).

The allowed increases, the commission said, will produce a net income of $5,365,000 to the company. The remainder will go to federal and state taxes.

Increases in the costs of operation, including a wage increase of $3,800,000 in 1957 had depressed the company's earnings below the "fair rate of return" on investment, which the commission set at 6.45 per cent.

Inter-Mountain Company Sells $3 Million in Bonds

Inter-Mountain Telephone Co., Bristol, Tenn., sold a 3-million-dollar issue of 5 per cent first mortgage bonds to Equitable Life Assurance Society of the United States, it was reported on Jan. 30.

The securities are callable after the first five years at prices declining from 105. Bonds are callable for a sinking fund at par.

Courts & Co. handled negotiations for the company.

Indiana Commission Gets New Secretary

George G. Cline of Indianapolis has been appointed secretary of the Indiana Public Service Commission. He succeeds the late Paul M. Tingle of Connersville who died last December.

Mr. Cline formerly was assistant to the vice president in charge of state and federal regulations of the Aero-Mayflower Transit Co.

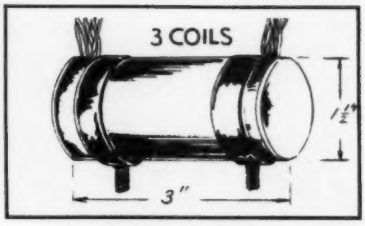
Southern Bell T&T Sued For Damages to a Finger

Southern Bell Telephone & Telegraph Co. is being sued for $5,000 damages by a Memphis, Tenn., woman who claims she cut her finger while dialing a number.

The *Chattanooga (Tenn.) Times* on Jan. 29 reported that Mrs. Jesse A.

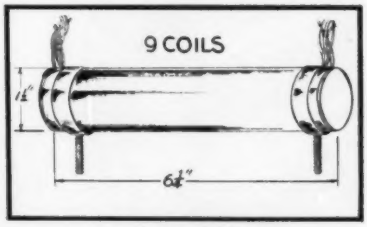
CEECO **IT'S NEW!** CEECO

CEECO TYPE C152 LOADING COIL CASES WITH TYPE C651 (44MH) OR TYPE C652 (88MH) COILS



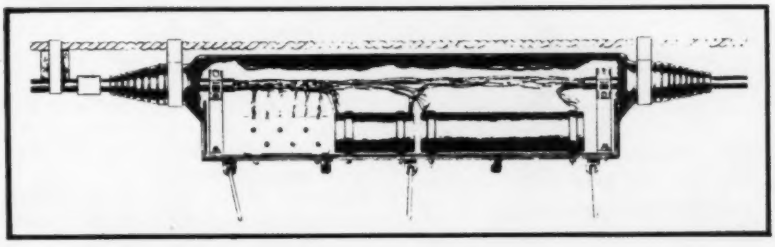
TYPE C152A CASE

- Mount direct in plastic cable splice.
- Coils encapsulated in plastic . . . moisture-free.
- Size and weights reduced yet maintain same or better electrical characteristics.



TYPE C152B CASE

CEECO TYPE 152 CASES CAN BE MOUNTED DIRECTLY IN THE NEW PLASTIC CABLE SPLICING - TERMINAL CASES, USING STANDARD 3/8" SOCKET WRENCH.



LOADING COIL CASE TYPE	CONTAINS COILS TYPE C651 OR C652	APPROXIMATE CASE SIZES DIAMETER	LENGTH	MAXIMUM WEIGHT
C152A	1 to 3 Coils	1½"	Up to 3"	½ Lb.
C152B	4 to 9 Coils	1½"	Up to 6¼"	1½ Lbs.
C153C	10 to 18 Coils	1½"	Up to 13"	3 Lbs.

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100 years of service to linemen, electricians and industry is back of this new Pocket Tool Guide No. 100. A copy will be sent to you on request, without obligation.

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Morris, a registered nurse, charged in her suit that the dial cap on her telephone came loose, cutting a finger. She said she was under a doctor's care for six weeks.

N. C. Independent Asks Stock Issue OK

Western Carolina Telephone Co. of Weaverville, asked the North Carolina Utilities Commission on Feb. 6 for authority to issue 89,291 shares of common stock with a par value of not less than $5.00 per share. The stock issue will raise funds to repay short-term bank notes for expansion and improvement of service.

The company serves about 10,000 subscribers in North Carolina plus subscribers in one Georgia county.

Bell in Louisiana Ordered To Pay Consultant's Fee

Southern Bell Telephone & Telegraph Co. on Feb. 10 lost its court fight against the Louisiana Public Service Commission's employment of a Washington utility consultant in the company's plea for a 16-million-dollar rate increase (TELEPHONY, Feb. 8, p. 28).

District Judge Coleman Lindsey upheld the "legality and reasonableness" of the $1,800 bill filed with Southern Bell by Arnold Hirsch, commission-hired consultant.

Under state law, the utility must pay commission consultants but can contest legality and reasonableness of fees.

Judge Lindsey ordered Southern Bell to pay the $1,800 representing an initial fee of $100-a-day for 18 days. The court rejected Southern Bell's move to delay or continue the hearing until it could have Hirsch in court for a questioning.

Commission Counsel Theo Cangelosi stressed Southern Bell had plenty of time before the one-day hearing to contact Hirsch for written testimony, if it wanted to do so.

Judge Lindsey said there was no question about the right of the commission to hire outside help.

The only issue before him, he added, was the specific $1,800 fee Hirsch filed. The Judge said Hirsch's $12,000 contract with the commission, based on 120 days of work, was not before the court. Lindsey commented he didn't know by what authority the commission could make such a contract.

The commission representatives argued Hirsch was needed to provide expert analysis of Southern Bell's rate raise request.

Southern Bell's rate case is scheduled to reopen on Feb. 26. The company opened the case last December with a request for a seven-million-dollar emergency interim rate boost, plus a permanent new rate structure which Commission Secretary Clayton Coleman testified would amount to 16 million dollars a year.

Wis. Commission OKs Sale of Two Independent Exchanges

The Wisconsin Public Service Commission recently approved the sale of two exchanges.

The Oconto Rural Telephone Co. was authorized to sell its Oconto exchange to the Wisconsin Telephone Co. (TELEPHONY, Oct. 26, p. 170). The commission said the 400 subscribers affected by the transaction will be billed at the higher rates of the Wisconsin Telephone Co. The Oconto company will continue to operate its Abrams exchange.

The Harmony Telephone Co., Peshtigo, was authorized to sell its property to the Amberg Telephone & Telegraph Co. Harmony serves about 250 subscribers.

Texas Independent Wins Increase of 15 Per Cent

The Gulf States Telephone Co., Tyler, Tex. on Jan. 29 was granted an increase of $1,200 per month over the company's present monthly income of $8,000 for its Athens exchange.

This 15 per cent increase granted by the Athens City Commission was the first the company has received since its 40 per cent increase in 1952. The company's original 1958 request had been for a raise of from 75 to 80 per cent.

C&P of W. Va. Asks Increase On Intrastate Toll Calls

The Chesapeake & Potomac Telephone Co. of West Virginia on Jan. 22 filed a petition with the West Virginia Public Service Commission to increase rates on intrastate toll calls.

The petition asks authorization for increased toll charges on intrastate calls to raise $666,000 in new annual revenues. Toll calls of 25 cents or more would be increased by approximately five cents under the proposed raise.

The company cited increased costs including a new wage increase granted to employes as the basis for asking the higher toll schedules.

This money would be in addition to the company's previously filed request

for increased rates that would bring $3,987,000 more per year (TELEPHONY, Oct. 5, 1957, p. 35). The commission hasn't reached a decision on these rates, which have been in effect under bond since Sept. 23.

Under the proposed new schedule, there would be a five-cent raise on each three-minute daily, night, or Sunday station-to-station call covering the complete present cost range of 25 cents and up.

For each additional minute on such calls there would be another five cents added for some mileage zones. Person-to-person calls also would go up five cents for extra minutes in most of the same zones.

The schedule fixes no extra charge in the scale below 14 miles. The first increase applies to the 14-18 mile zone for which a three-minute station to station call would be raised from 25 cents to 30 cents.

For 271 to 292 miles, the highest mileage included in the scale, the present charge is $1.15 daily for a three-minute call. On nights and Sundays the same call costs $1.00.

Wisconsin Telephone Co. Sued in Death of a Boy

The parents of a boy, 3, who choked to death on a tack that allegedly fell from a telephone line in their home, on Feb. 7 filed a $17,959 suit in Milwaukee, Wis. circuit court against the Wisconsin Telephone Co.

Mr. and Mrs. Leo Gulczynski, of Milwaukee claimed that their son swallowed the tack on Feb. 6, 1956.

La. Independent Asks Increase

On Feb. 20, the Louisiana Public Service Commission heard a request of the Breaux Bridge Telephone Co. to increase rates to subscribers of the Breaux Bridge, Arnaudville, Cecilia and Parks exchanges.

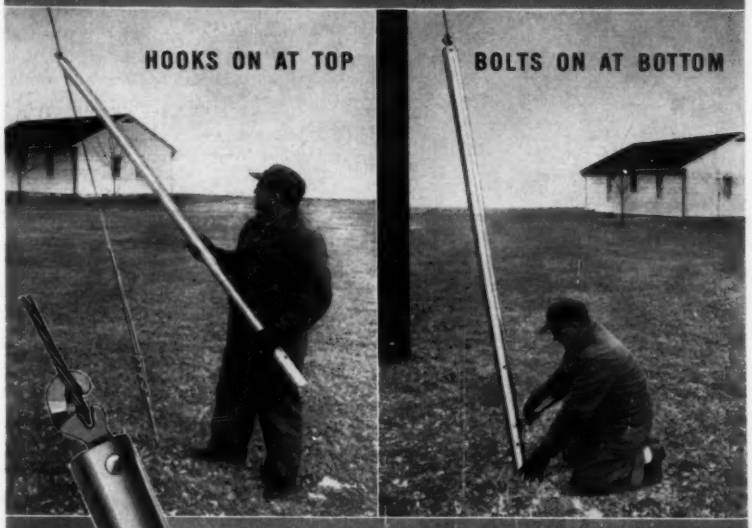
Ill. Independent Asks Raise

A hearing by the Illinois Commerce Commission was held on Feb. 5 on the application of the Deer Creek Telephone Co. for a rate increase. The company filed the application on Dec. 18.

Suspend Canada Rate Raise

Canada's Board of Transport Commissioners on Feb. 1 was reported to have suspended the 10.3-million-dollar rate increase granted the Bell Telehone Co. of Canada (TELEPHONY, Feb. 1, p. 44). Further hearings are to begin on Mar. 1.

Question: What makes the CHANCE 808 GUY GUARD the groundman's preference?



Answer: Ease of Installation!

Single bolt at lower end of guard fastens to guy rod . . . or to guy wire . . . or to guy loop. You get proper installation every time.

Guy Guards that are easy to install are easy to get installed where and how you want them. The Chance 808 is an inexpensive guy guard designed for fast, easy installation. Even a midget can install it—there are no high bolts to fasten at the top—only one bolt at the bottom.

The 808 hooks easily around the guy wire at the top. The hook binds to hold tight when bottom of guard is brought into position. Hook holds guard away from wire to eliminate noisy vibration. Flanged edges of hook prevent strand cutting, and help to keep guard in position.

Economical too!

The Chance 808 is economical in first cost . . . in labor costs . . . and in service. It is made of heavy gauge steel, hot dip galvanized for long life and high visibility. Edges are turned in for extra safety and rigidity.

Get the Chance 808 from your Line Equipment Wholesaler. Your groundmen will like its features . . . and you'll like the savings.

A·B·CHANCE CO·
CENTRALIA, MISSOURI
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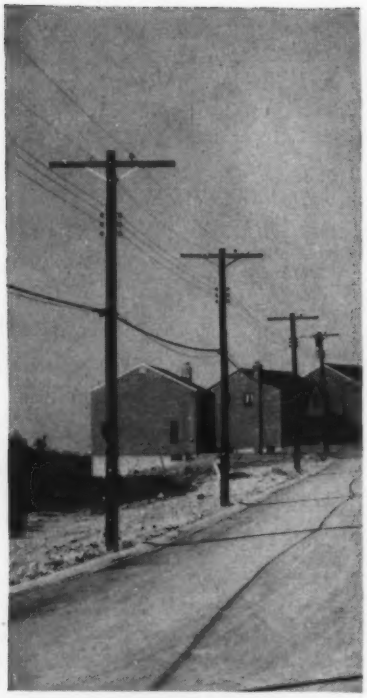
CP58-A



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Poles and crossarms constitute a large share of a utility's total investment. That's why it is so important that the poles installed today give maximum service. And you can be sure of lowest-per-year costs when you use Koppers pressure-treated poles and crossarms. Proof of this low-per-year cost is evident in the many millions of Koppers poles set in the past 50 years. So few have been removed that it's impossible to estimate accurately their maximum service life . . . but 30, 40 and 50 years service is not unusual.

One fact is pointed up. Koppers pressure-treated poles and crossarms have the strength and durability required to assure continual low-cost operations decade after decade.

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Write for the 38-page guidebook on pressure-treated poles, crossarms, timbers. It is jam-packed with valuable data.

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C-9

KOPPERS POLES

REA Approves Eleven Loans Totaling $9,431,000

THE Rural Electrification Administration has approved the following rural telephone loans:

Murraysville Telephone Co., Export, Pa.; $2,992,000; Jan. 21.

The new borrower plans to use these funds to furnish initial service to 3,488 rural families and to improve service for its 3,167 existing subscribers. The company now operates an automatic exchange at Harrison City, and a common battery exchange at Newlonsburg.

New construction scheduled includes a combination automatic central and commercial office building at Newlonsburg. Automatic facilities at Harrison City will be expanded to serve additional subscribers.

Harold G. Payne is president and manager of the Murraysville Telephone Co.

•

Comer (Ga.) Telephone Co.; $285,000; Jan. 27.

The borrower plans to use these funds to provide facilities to serve 161 subscribers not included in prior loans; complete previously authorized construction and provide service without toll charge between all of its exchange areas and the town of Athens with the exception of the Carlton exchange.

REA loans to the borrower now totaling $1,247,000, provide for new and improved service to 2,200 rural subscribers. The completed system will consist of automatic exchanges at Carlton, Colbert, Comer, Danielsville, Ila, Lexington and Winterville. Of the 1,450 subscribers now served, about 950 get dial service.

John Birchmore is president and manager of the Comer Telephone Co.

•

Souris River Telephone Mutual Aid Corp., Velva, N. D., (mailing address: Minot); $315,000; Jan. 27.

This loan will finance improved service for 313 existing rural subscribers and initial service for 107 farm families. Present subscribers now receive magneto service from the Landa Telephone Co. and the Lone Star Rural Telephone Cooperative Association at Glenburn. The borrower plans to acquire these facilities. New automatic central offices are slated at Glenburn and Landa.

REA loans, now totaling $4,322,000 will enable the borrower to furnish new and improved service to 5,635 rural subscribers. The completed system will consist of 23 exchanges of which Berthold, Des Lacs, Westhope, Martin and Sherwood are in operation. About 1,900 rural subscribers are now receiving dial service.

Raymond Verdsel is president and Paul A. Froemming is manager of the Souris River Telephone Mutual Aid Corp.

•

Midstate Telephone Co., Kimball, S. D.; $328,000; Jan. 27.

The loan funds will enable the borrower to improve service for 430 existing subscribers and to furnish initial service to 93 rural families. The existing subscribers are now receiving magneto service from the Stickney Telephone Co., the West Telephone Co. (a switcher organization near Pukwana which the borrower proposes to acquire), and the Farmers Cooperative Telephone Co. serving an area in and around Joubert and New Holland, which plans to abandon its properties to Midstate.

New construction scheduled by the borrower includes automatic central offices at New Holland and Stickney. Provision is also made in this loan for the acquisition and renovation of a building in Kimball to serve as headquarters for the whole system.

The two REA loans to Midstate totaling $1,201,000, will enable it to bring new and improved service to 1704 rural subscribers. The system will consist of six exchanges when it is complete. The Gann Valley, Kimball, Pukwana, and White Lake areas are in operation.

H. D. Brown is president and Cliff Guernsey is manager of the Midstate Telephone Co.

•

Hartland & St. Albans Telephone Co., Hartland, Me.; $57,000; Jan. 28.

The borrower plans to use the loan funds to complete its authorized system, increase its proportion of private and semi-private lines, and furnish service to a Civil Aeronautics Administration installation in the area.

The present and a prior REA loan, totaling $207,000, will enable the borrower to provide dial service to 589 subscribers. The system is now in operation and provides dial service to about 530 rural subscribers.

Dr. Arthur L. Moulton is president and manager of the Hartland & St. Albans Telephone Co.

Haxtun (Colo.) Telephone Co.; $138,000; Jan. 29.

This loan along with funds from prior loans will finance improved and expanded service for rural subscribers served by the Fleming Telephone Exchange, which the borrower has recently acquired. This exchange now provides magneto service to 250 families and other rural establishments.

New construction planned includes an automatic central office at Fleming. The rehabilitation and expansion will enable the borrower to serve 46 additional farm families in the area now without telephones.

This loan will also reimburse the borrower for general funds spent on the acquisition of the Fleming telephone property.

REA loans to this borrower, now totaling $611,000, will enable it to furnish new and improved service to 1,290 subscribers. The completed system will consist of three exchanges of which Haxtun and Crook are already in operation serving approximately 890 subscribers.

Floyd L. Reyher is president and manager of the Haxtun Telephone Co.

•

The S & T Telephone Cooperative Association, Brewster, Kan.; $405,000; Jan. 30.

The borrower plans to use the loan funds to provide improved service to 332 current subscribers and initial service to 233 farm families. The subscribers to be added in an expanded operating territory are now receiving magneto and a limited amount of dial service from the Logan County Telephone Co. at Winona, and the Grinnell Telephone Co. The borrower plans to acquire the Logan County company, and has recently acquired the Grinnell Telephone Co. Funds are included in this loan to discharge indebtedness incurred by the borrower in the Grinnell acquisition.

New construction scheduled includes automatic central offices at Winona and Grinnell. The small automatic switchboard at Page City will be salvaged and this community served from the Winona exchange.

The present and a prior REA loan to this borrower, totaling $849,000, will make possible new and improved service to 1,126 rural subscribers through five exchanges of which Brewster, Kanorado and Levant are in operation.

Carl M. Denton is president and Ben M. Wagner is manager of the S & T Telephone Cooperative Association.

•

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fisher, Okla.; $4,600,000; Jan. 30.

The borrower plans to improve service for 7595 present subscribers, and to furnish initial service to 651 rural subscribers.

The subscribers to be added in an expanded operating territory include 1,554 switchers receiving magneto and common battery service from fifteen exchanges now owned and operated by the Western Light & Telephone Co., Kansas City. They are: Canton, Covington, Crescent, Custer City, Garber, Hennessey, Hunter, Kingfisher, Marshall, Okarche, Orlando, Pond Creek, Seiling, Thomas, and Watonga. The cooperative plans to acquire these exchanges, which consist of two common battery and 13 magneto switchboards.

According to the borrower's present plans, the Garber, Marshall, and Watonga buildings will be modified and retained in use, the lease will be renewed for the Pond Creek building, a new automatic equipment room added to the Kingfisher building, and new central offices built at the remaining exchanges. New automatic facilities will be installed at all locations.

REA loans to this borrower now total $5,914,000, which will enable it to furnish new and improved service to 10,761 subscribers. The system will consist of 25 exchanges of which Faye, Geary, Loyal, Oakwood and Omega are in operation serving over 1,000 subscribers.

T. W. Beiland is president and Roy C. Boecher is manager of the Pioneer Telephone Coop.

•

Brantley Telephone Co., Nahunta, Ga.; $51,000; Feb. 3.

The borrower plans to use the funds to furnish service for 117 rural subscribers in its area not included in a prior loan.

Original plans of the Brantley company called for service to 393 rural subscribers within a five-year period. However, after about four years of operation, it was already serving 423 rural families.

The present and a prior REA loan to this borrower, totaling $232,000, will enable it to serve 510 rural subscribers. The two exchanges are located at Hoboken and Nahunta.

Avery Strickland is president and manager of the Brantley Telephone Co.

•

Matanuska Telephone Association, Palmer, Alaska; $70,000; Feb. 7.

This loan will enable the borrower to complete the system authorized under two previous loans. All three of the REA loans, totaling $756,000 will make it possible for the borrower to serve 951 subscribers. Automatic offices are located at Chugiak, Palmer, Sutton, and Wasilla. They are now in operation serving approximately 600 subscribers.

Eugene Reid is president and Robert Max Clements is manager of the Matanuska Telephone Association.

•

Northeast Florida Telephone Co., Macclenny, Fla.; $190,000; Feb. 7.

This loan will finance service to 159 rural subscribers, including PBX installations for both the Northeast Florida State Hospital and a county hospital. The loan also provides for an increase in the proportion of private and semi-private lines.

REA loans totaling $534,000 have been approved for the Northeast Florida company. These funds will enable the borrower to provide new and improved service to 859 rural subscribers. The completed system will convert Macclenny to automatic operation.

S. D. Roberts is president and manager of the Northeast Florida Telephone Co.

C. D. Ingebrand of Indiana Leaves Telephone Industry

C. Dan Ingebrand of Fort Wayne, division manager of General Telephone Co. of Indiana, left his position on Jan. 24 to become president of the Fort Wayne Dairy Equipment Co.

Mr. Ingebrand had been division manager since January 1957, when The Home Telephone & Telegraph Co. was merged with General Telephone Co. of Indiana.

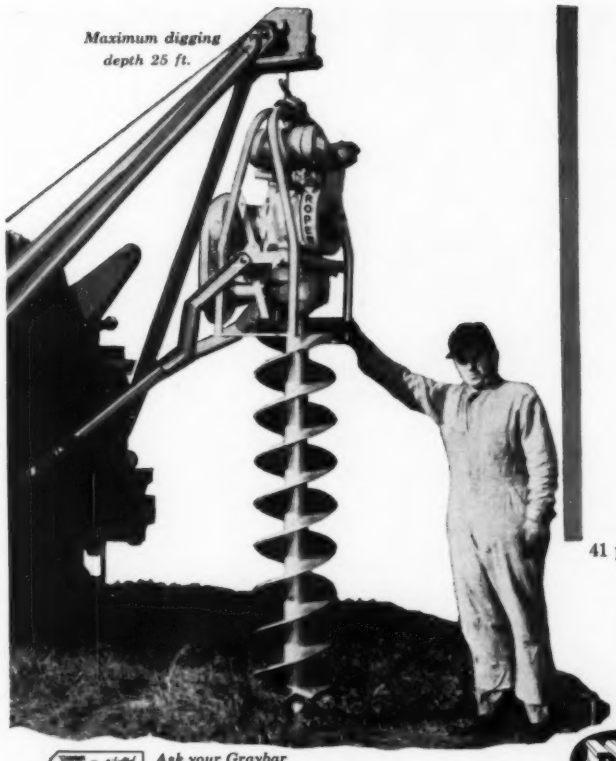
Mr. Ingebrand had been an active worker in Indiana Telephone Association activities. He was a member of the District Five Small Company Committee and served as chairman of the 1955 General Convention Committee.

Named to Pacific T&T Post

John O. Einerman on Jan. 27 was elected vice president of Pacific Telephone & Telegraph Co., effective Feb. 1. According to reports, he is slated to become vice president and controller on Mar. 28, succeeding Sam W. Campbell, who is retiring.

New Mexico Rate Rehearing

The New Mexico Corporation Commission on Feb. 5 ordered a rehearing on more than $100,000 in rate increases which had been approved earlier for Mountain States Telephone & Telegraph Co. in Clovis-Texico, Portales, Carrizozo and Socorro.



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SPARTANBURG, SOUTH CAROLINA

PLANTS AT SPARTANBURG, SOUTH CAROLINA AND WILMINGTON, NORTH CAROLINA

IN THE NATION'S CAPITOL

Concluded from page 18

risks in search for new sources of supply; that the effect in the long-run would be to limit supplies and bring higher prices to the consumer; that such restrictions on the discoverer and producer would work against the national interest.

The arguments *for* federal price controls, in the usual cost-plus-reasonable-profit formulae for utilities, are that they would keep down costs to the consumer; that they would hold producers' profit to figures generally considered reasonable; that natural gas, unlike coal or oil, is transported in fixed pipelines and distributed to a given consumer market by a single company, leaving the consumer no freedom of choice; that the production and sale of natural gas thus has aspects of a monopolistic utility; that there has been established the principle that enterprises of this nature are properly subject to control; that in this case control by the states would not work, and so federal control is called for.

One of the arguments advanced by the supporters of the gas bill is wearing a little thin with the passing years of this controversy. That was the horror story first spread in 1950 that FPC control would frighten away investors and destroy the incentives of the producers to go out and discover enough gas supply. There was also the hint that the Southwestern state producers might get so mad that they would embargo the supply and let the Yankees up North freeze rather than sell gas into interstate commerce via the pipelines. So far, there is little evidence that any of these things have come to pass or are likely to come to pass. Natural gas is coming into more and more demand and will doubtless be more expensive. But, there is still plenty of drilling and willingness to risk the financial outcome.

On the other side of the picture, the practical arguments of the FPC about the procedural difficulties of administering this type of regulation have been borne out by the facts. The FPC case load has built up steadily and there is no discernible solution, mainly because most of the larger producers were putting their chips on the possibility that Congress would repeal or amend the law and let them off from FPC control.

Now, that that door has been closed (and probably closed for good), the situation would seem to call for some working out of a procedural solution which would enable the producers to live within the law which the U. S. Supreme Court has laid down. Unless Texas and some of the other Southwestern states want to secede from the Union, some compromise along that line will have to happen. The FPC has shown its willingness to try for any common sense approach which the courts will allow. A congressional amendment would have put an end to all doubt on this worrisome subject. But, as Senator Flanders so aptly put it, the supporters of the bill cooked their own goose with their own gas and oil.

Fred S. Florance Elected President of N. Y. Company

Fred H. Florance, president of the Highland Telephone Co. of Monroe, N. Y., since 1937, on Feb. 10 was elected to the newly-created office of chairman of the board of directors.

Mr. Florance was succeeded as president by his son, Fred S. Florance of Blooming Grove, N. Y., who also remains as general manager of the company. Fred S. Florance has been with the company since 1930 and has served as general manager since 1943.

E. Keith Chase, whom stockholders elected to his first term as a director, was named by the board to succeed Fred S. Florance as secretary. Mr. Chase was also re-elected assistant treasurer, while his former position of assistant secretary went to Robert A. Schoonover of Monroe.

Re-elected to office were Roswell F. Greene of Washingtonville, N. Y., vice president and Lee B. Mailler of Cornwall-on-Hudson, N. Y., treasurer.

The elder Mr. Florance has been associated with the Highland Telephone Co. for all but the first three of its 58 years. Prior to becoming president, he was secretary of the company for many years.

Founded Jan. 26, 1900, with a capitalization of $2,000 and less than two dozen subscribers, the company today has assets exceeding 4.4 million dollars and serves more than 10,200 telephones.

The sixth largest Independent telephone company in New York state, Highland operates exchanges at Chester, Goshen, Highland Mills, Maybrook, Monroe and Washingtonville. All have dial service except the Goshen exchange, which was acquired in late 1956 and which will be converted to automatic this Spring.

Alaska Company Names Head

Edward Aude was named president of the Kewaunee-Alaska Telephone Co. at the company's annual meeting, it was reported on Jan. 29. Other officers are Edward Stepanek, treasurer, and John Fiala, secretary.

Learn From The First

"If you would not have affliction visit you twice, listen at once to what it teaches."—BURGH.

Answers to Questions On Page 30

(1) When the operator thinks a correction cannot be made satisfactorily.

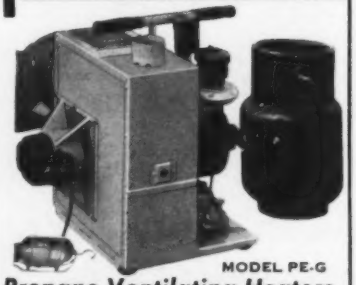
(2) Yes. This is done by drawing lines through the entries not required for the correct type.

(3) Yes.

(4) A message rate ticket is written for charging purposes on calls in the local service area from message rate lines where registers are not used or when a call cannot be registered.

(5) An "A" board toll ticket is written for charging purposes on calls which the operator is to handle to points outside the local service area.

WHAT'S NEW



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SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST

INWARD DIALING TO PBX EXTENSIONS

Continued from page 22

Directory and Information Arrangements

It is not contemplated that PABX extension stations arranged for inward dialing would be listed in the telephone company exchange directory. If telephone directory listings of night numbers or direct dialing numbers for certain stations or departments are desired by the subscriber, these would be handled as "A" or additional listings as at present. The regular listed number, together with any "A" listings, would be used in the telephone company directory as at present, and no changes in information service practices would be involved.

The PBX subscriber would, of course, issue his own directory of personnel and departments, giving the full central office numbers for all in-dialing stations. These directories would contain in-dialing instructions and would be circulated outside the organization to those persons doing regular business with company employes. Postcards may be mailed by employes to those who frequently call them. All information regarding PBX station numbers and personnel would be handled by the subscriber attendants as at present.

Transferring of Inward Calls

In-dialed calls cannot be transferred to another station under the arrangement shown in *Figs. 1* and *2*. If a transfer is required or anticipated, the call must be placed over the listed number trunks via the attendant. This arrangement is generally considered satisfactory. However, if the transfer of incoming calls which have been dialed directly to an extension station is desired, equipment may be added in the incoming trunk circuit to provide this feature. This equipment is actuated whenever an extension user flashes his switchhook on an incoming call and causes the connection to be extended to the attendant over an appearance of the incoming trunk at the switchboard and an associated trunk signal to be lighted. The attendant answers and makes connection as requested, after which the first called extension hangs up.

Attendants' Services

All services now rendered by the attendant are available under in-dialing. These include the regular answering and switching services on inward calls placed over the regular listed number trunks, giving assistance or manual switching on outgoing and on extension-to-extension calls when desired, establishing conference calls, etc.

When the jack multiple of the extension lines is omitted from the attendant's switchboard, she must dial the last two or three digits of the extension number over her dial trunks in completing incoming calls received over the listed number trunks, or in making connections to extensions for any other reason. If it is desired to permit the attendant to make connection to a busy extension line (that is to override the busy), in order to advise of an important call waiting, to check for receiver off-hook or an out-of-order, etc., a trunk may be provided from the attendant's switchboard to a test selector as indicated by the dotted lines on Fig. 1.

Tie Trunks

The need for tie trunks between two PABX locations is greatly reduced with inward dialing arrangements, since calls can be dialed directly from one PBX location to another over the central office trunks by dialing "9" and the full central office number of the called extension. The cost to the subscriber of the tie trunks *vs.* the cost of central office trunks, the volume of the tie trunk traffic, and the convenience of dialing fewer digits over the tie trunks, are factors in considering tie trunks as against using central office dialing. Of course, in message rate areas, the message charge via the central office would favor tie trunk provision from the subscriber's standpoint.

Transmission Considerations

On inward calls placed to PBX extensions via the attendant, the transmitter battery for the PBX station is generally supplied from the central office over the PBX trunk through the cord circuit. On directly dialed in-calls, the station talking battery is supplied from the PBX connector, which in many cases will be at the same location as the extension station. On out-dialed central office calls, the talking battery is also generally supplied from the central office over the central office trunks. Some companies, however, are furnishing talking battery to the PABX extension from the ninth level outgoing trunk repeater at the PBX. Talking battery is, of course, furnished from the PABX connector on extension-to-extension dialed calls. It is probable that, with inward dialing, transmitter battery for the extension stations would be supplied from the

PABX equipment under all conditions.

With the extension station battery supplied from the PBX (when the station is connected to central office trunks) the PBX, from a transmission standpoint, should be considered as an end central office and the trunk circuit between the central office and the PBX considered as a termination link. In certain locations, this may require upgrading of the central office trunk facilities.

Rate Treatment

The provision of inward dialing arrangements for PABXs may eventually result in considerable change in the principle of applying rates for the PBX equipment and services furnished by the telephone company. However, the present monthly charges for PABX selectors, connectors, central office trunks and miscellaneous items, if applied to the additional equipment and central office trunks required, might be adequate, in most instances, to introduce the new service. In step-by-step areas, the telephone company is generally saved the cost of carrying the inward dialed traffic to the PBX through a rank of selectors and/or connectors in the central office. Experience with this new service covering a number of different sizes and types of businesses will, of course, indicate what rate changes will be needed for a more permanent rate structure.

Prospects for Inward Dialing

Obviously, PABX systems, such as those serving utilities, factories, wholesalers, jobbers, government agencies, the armed services, etc., are the best candidates for inward dialing. A determination of the proportion of the inward calls which might be directly dialed by the caller knowing the station number, would permit estimating the savings to the subscriber in attendants' wages. If this saving will equal or exceed the added monthly equipment charges which the subscriber would have to pay, he should be interested in the improved service which he and his customers may obtain by the inward-dialing facilities.

Conclusion

Due to the many advantages of direct inward dialing to subscribers, this improved service will, no doubt, soon be in considerable demand. Telephone managements should study the possibilities and the probable future requirements for this service in each of their central offices, and should arrange for adequate allocations of telephone numbers (central office codes). Numbering plans used for central office design should be based on future requirements for in-dialing of present and estimated new PBX systems.

The advantage of this new service to the telephone company should stimulate interest in studying the possibilities of profitably selling the service to present customers who would benefit therefrom.

Of course, such studies should consider carefully the central office arrangements and costs involved, the effect on future main station capacity, compatibility of circuits, etc.

While each PABX, which appears to be a candidate, should be studied on its own merits, the effect on all central offices in operation by the company must be considered from the standpoint of the total demand which might result.

Helicopter Sets Poles In California Mountains

Three miles of new power lines have been installed in rugged mountain country near Solvang, Cal., by helicopters, Pacific Gas & Electric Co. announced recently. Both the setting of poles and the stringing of wire were done by helicopter in what is believed to be the first successful application of aircraft for this purpose.

Operating at elevations ranging up to 4,300 feet, a 12-passenger (Sikorsky) machine placed 59 wooden poles, one at a time, in holes previously dug on almost inaccessible land in Los Padres National Forest. A two-passenger (Bell) helicopter was used to transport personnel.

After the pole holes were filled and tamped by the same ground crews that had dug them earlier, the two-passenger helicopter made a series of passes over the crossarms of the poles and laid out the three strands of wire necessary to carry the 12,000-volt current. The wires will be attached manually to the insulators in the next several days.

The line, which passes through canyons and up steep slopes, replaces an older one which runs along an exposed portion of the mountain where winds sometimes reach 100 miles per hour during winter storms. It will serve a Santa Barbara, Cal. television station (KEY-T). A second portion of the line, to be built later, will serve radio outposts of the Santa Barbara County sheriff and the U. S. Forest Service.

"The use of helicopters actually proved economical and time saving and we are sufficiently pleased with this test to consider similar projects in the future," T. E. Ward, of Salinas, Coast Valleys division manager of PG&E, declared.

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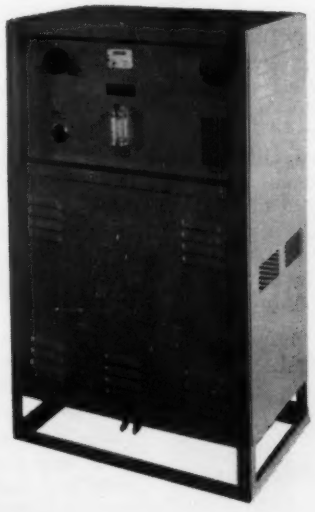

Exchange equipment designed to supply chemically dry air for telephone cables, aerial and underground, this unit can supply as many as 30 cables. The unit is equipped with volume recording air meter, high and low pressure alarm switches, humidstat and hour meter.

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Calls for Repeal of Telephone Excise Tax

The editor of the *Industrial News Review*, which is distributed to newspapers and other publications all over the country, recently called for the repeal of telephone excise taxes.

Pointing out that a recent Gallup Poll had found that the tax on telephone service is the most unpopular of all excise taxes, he stated:

"The federal excise taxes used to be confined to a small list of luxury items —liquor, furs, tobacco products, etc. Then, as a World War II emergency measure, these taxes were extended to certain purely necessary and essential services, such as transportation and the telephone.

"A Gallup Poll has found that the tax on telephone communications is the most unpopular of all excise taxes, for the simple reason that it adds to the cost of a genuine necessity.

"Moreover, state regulatory authorities condemn this tax as being 'inimical to the maintenance of reasonably priced and non-discriminatory communications service,' because it adds unreasonably to the rates and charges which they have carefully established. On top of that, it is undoubtedly a discriminatory tax, since it singles out the telephone from the other essential household services.

"Emergency taxes, in simple honesty, should be discontinued when the emergency which brought them into being passes. World War II ended some 12 years ago, but the telephone tax and the other excise taxes imposed then are still on the books.

"And the tax, it should be understood, is a consumer tax. Its repeal would result in a direct saving for the telephone user. No part of the tax saving could be retained by the telephone companies."

USITA's Management Program Is Described; Deadline Soon

Considerable interest has been shown in the United States Independent Telephone Association's first Management Development Program at the University of Kansas, Lawrence, according to Ray Dalton, chairman of the USITA's Personnel Committee (TELEPHONY, Feb. 15, p. 35).

Sponsored by this committee and The School of Business, of the University of Kansas the program will be held from July 14 to Aug. 9.

The over-all objective of the program is to help Independent management personnel do a better job in their current positions as well as to prepare them for more challenging administrative responsibilities.

Participants will be helped to broaden their horizons with respect to their own jobs and to the current and future positions of their companies. Additional perspective will be afforded on how their own particular function fits into the entire company's operations. This program doesn't attempt to make every man a specialist in every field, but rather to help him understand each specialty.

The program is divided into three areas, (1) The Function of Administration, (2) the American Business Climate and (3) Rate Regulation.

Section 1 will focus attention on the fields of control and financial administration, human relations in business, merchandising, and administrative policy and planning. This part of the program will consist mainly of the analysis and discussion of business cases.

In Section two, the administrator will be helped to understand more about himself and the problems of his work by relating each to the entire society in which he operates.

In Section three participants will study the theory of regulation, current trends in regulation, and management's responsibility with respect to rate regulation.

The program, which is limited to 48 participants, is under the direction of Dean James R. Surface of The School of Business of the University of Kansas.

Deadline for applications is March 15. The fee for the program is $850 per participant including classroom materials, meals, and lodging.

Requests for information, applications, and checks for the enrollment fee should be sent to Dean J. R. Surface, School of Business, University of Kansas, Lawrence, Kan.

Obituaries

DR. CLINTON J. DAVISSON, 76, 1937 Nobel Prize winner in physics, and a Bell Telephone Laboratories scientist for nearly 30 years, died on Feb. 1 at his home in Charlottesville, Va.

Dr. Davisson was awarded the Nobel Prize for his discovery of electron diffraction and the wave properties of electrons, a cornerstone of the theory of wave mechanics upon which rests much of the physicist's present understanding of fundamental particles and the structure of atoms.

After his retirement in 1946, he went to Charlottesville and served for two years as visiting professor of physics

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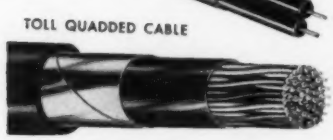

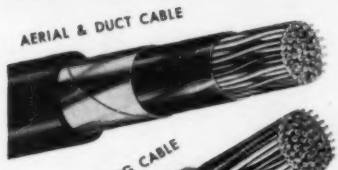

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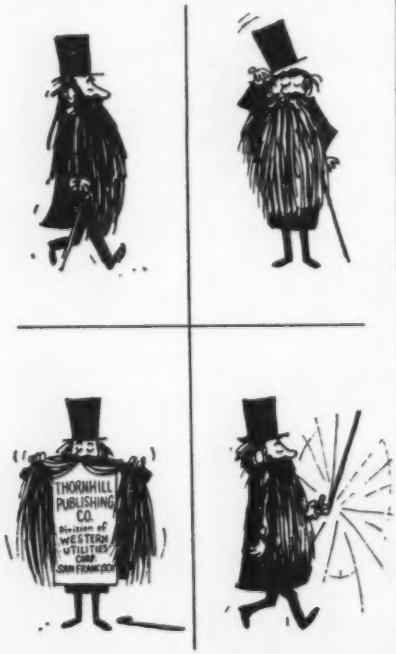

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at the University of Virginia there.

Dr. Davisson was born in Bloomington, Ill., was graduated from the University of Chicago in 1908 and received his Ph.D. degree from Princeton University in 1911. From 1911 to 1917 he was an instructor of physics at the Carnegie Institute of Technology and then went to the Western Electric Co.'s engineering department, which subsequently became Bell Telephone Laboratories.

Other honors which Dr. Davisson received for his work included the Comstock Prize of the National Academy of Science in 1928, the Elliott Cresson Medal from the Franklin Institute in 1931 and the Hughes Medal of the Royal Society of London in 1935.

He leaves his wife, the former Charlotte Richardson, three sons, Owen of Ambler, Pa.; James of Washington, and Richard of Boston; a daughter, Miss Elizabeth Davisson of Charlottesville, and a sister, Mrs. L. B. Jackson of Bradenton, Fla.

•

Ross C. Wickersham, manager and a member of the board of directors of the Tipton (Ind.) Telephone Company, Inc., died in Tipton on Jan. 2, as the result of a heart attack.

Mr. Wickersham was honored on Oct. 2, 1955, at a dinner on the occasion of his 50th anniversary with the company for which he started as a lineman. Over the span of 50 years, he advanced to superintendent, manager and a member of the board of directors. When Mr. Wickersham started with the company, it served only 500 customers. Today the company has a new automatic exchange and serves 3,000 subscribers.

He is survived by his wife and a son, Robert R. Wickersham Sr., of Pendleton, Ind.

Announce $40,000,000 Expansion in Chile

Approximately 84,300 telephones and 421 long distance circuits, costing 40 million dollars will be added in the next eight years to Chile's existing telephone system, it was announced in New York City on Feb. 5 by Eugene Le Baron, vice president of the Telecommunications Operating Group of International Telephone & Telegraph Corp.

Mr. Le Baron said the expansion is being undertaken by Compania de Telefonos de Chile, IT&T subsidiary, which currently operates 97 per cent of Chile's 155,670 telephones.

The expansion program will be undertaken pursuant to the agreement of Jan. 15, 1958, between the company and the government which implements the company's 1930 concession, particularly through its reaffirmation of the Cia. de Tel. de Chile's right to a 10 per cent net return on gold peso net investment after operating expenses, depreciation and taxes.

The new tariffs, which became effective Feb. 1, 1958, represent an increase of 94 per cent over previous tariffs, Mr. Le Baron said.

NEW DEVELOPMENTS

(Continued from page 48)

A new oblique plier, with the shear cutter, is shown in *Fig. 60*. This tool is suitable for cutting hard wire or dead soft wire. The shearing action

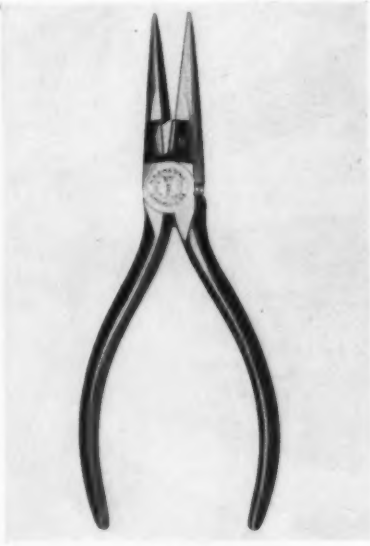
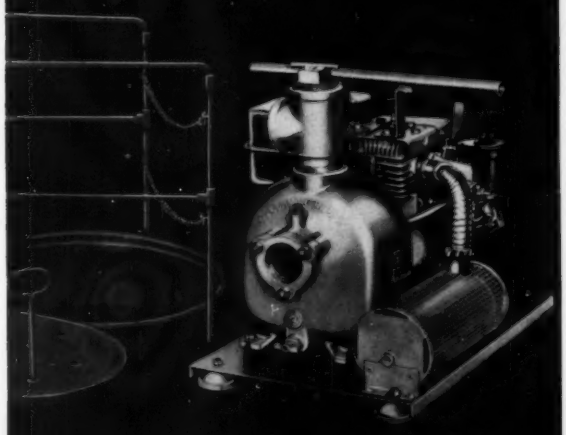


Fig. 59

Fig. 60

GORMAN-RUPP DEWATERING PUMPS

equipped with muffler
and hand throttle
for quiet zones



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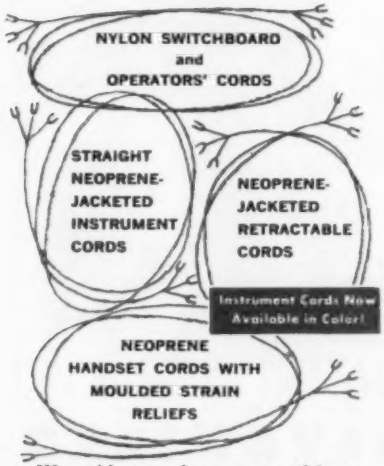
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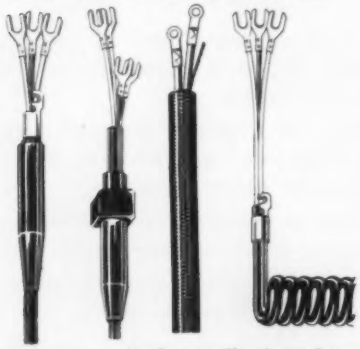

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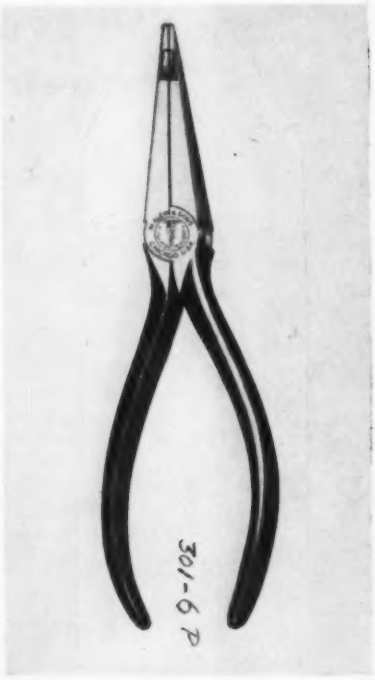

Fig. 61

assures easy cutting and the regular cutters at the nose give added usefulness and convenience. The shear blade is replaceable.

The long nose plier with knife at point is shown in *Fig. 61.*

Graybar Names Manager At Jacksonville, Fla.

D. L. Harper, Peninsular district manager of the Graybar Electric Co., Inc., announces the appointment of R. W. Wright as operating manager at Jacksonville, Fla. on Feb. 1.

Mr. Wright joined Graybar, Jacksonville as a voucher clerk in May 1942. In 1944 he was appointed creditman and in the same year became warehouse foreman. A year later he was appointed buyer and head of stock maintenance. After a year of military leave, Mr. Wright returned to Jacksonville in 1946 as office salesman. In 1950 he transferred to Tampa in the same capacity. Two years later he was promoted to operating manager at that location. In 1955 he transferred to Miami in that capacity, returning to Tampa a year later as manager of merchandise investment, the position held until his recent promotion.

Recordak Corp. Appoints General Sales Manager

Van B. Phillips has moved up from assistant to general sales manager, Recordak Corp., New York City, according to an announcement by John K. Boeing, president of the microfilming subsidiary of Eastman Kodak Co.

Mr. Phillips joined Recordak as a salesman in the Oklahoma City office in 1936. A bank clerk just out of high school at the time, and only 19, he was the youngest salesman ever hired by the company.

After service in the Navy during the war, Mr. Phillips returned to the company, worked his way up through the Dallas, Denver, San Francisco, and Chicago offices as salesman, manager of successive branches and regional sales divisions.

Name New Stromberg-Carlson General Credit Manager

The appointment of Lester G. Wilterdink as general credit manager of Stromberg-Carlson was announced on Jan. 30 by Charles W. Pritchard, treasurer. Stromberg-Carlson is a division of General Dynamics Corp.

In his new capacity, Mr. Wilterdink succeeds Arthur J. Fink, who now will

L. G. WILTERDINK

be able to give full time to his responsibilities as assistant treasurer. These responsibilities include general supervision over all credit policies, Mr. Pritchard said.

Mr. Wilterdink is a native of Lincoln, Neb., and a graduate of the University of Nebraska. He also holds a Master's Degree in Business Administration from the Harvard Business School. He joined Stromberg-Carlson in 1952 as a staff assistant in the credit department and later was made assistant general credit manager.

During World War II, Mr. Wilterdink served as an artillery officer in the Southwest Pacific. Subsequently he was an executive officer in the Purchases Branch of the Army.

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The Elbe File & Binder Co., Inc., Fall River, Mass., published an all-new, 116 page, loose-leaf & sales presentation catalog. It lists over 1500 stock items and hundreds of made-to-order binders. The features: 1. An exclusive loose-leaf planning section; 2. Helpful idea sections for increasing office and sales efficiency; 3. Special sections dealing with sales tools, custom-made products, advertising specialties, business gifts and visual aids; 4. Dozens of all-new stock lines and advanced styles.

William Tucker Named Chairman of North Electric

William Tucker, former president and chief executive officer of the F. C. Russell Co., Cleveland, O., has been

WILLIAM TUCKER

named chairman and chief executive officer of North Electric Co. of Galion, O., a member of The Ericsson Group, it was announced on Feb. 4. Hans Kraepelien continues as president of the company.

HANS KRAEPELIEN

Before joining the F. C. Russell Co., a manufacturer of metal windows, doors and related products, Mr. Tucker, 49, was a manufacturing executive with the Crosley Division of Avco Mfg. Corp., Cincinnati, O. He was educated at Carnegie Institute of Technology and Wayne University.

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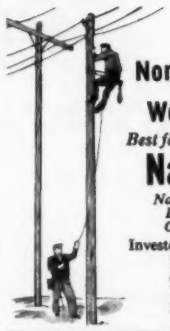

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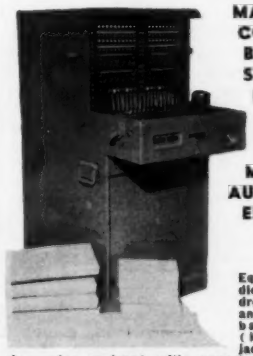

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PLANT ENGINEERS for large Independent Telephone Company. Some experience necessary. In reply state age, educational and employment history. Address reply to Personnel Supervisor, Rochester Telephone Corporation, 10 Franklin Street, Rochester 4, N. Y.

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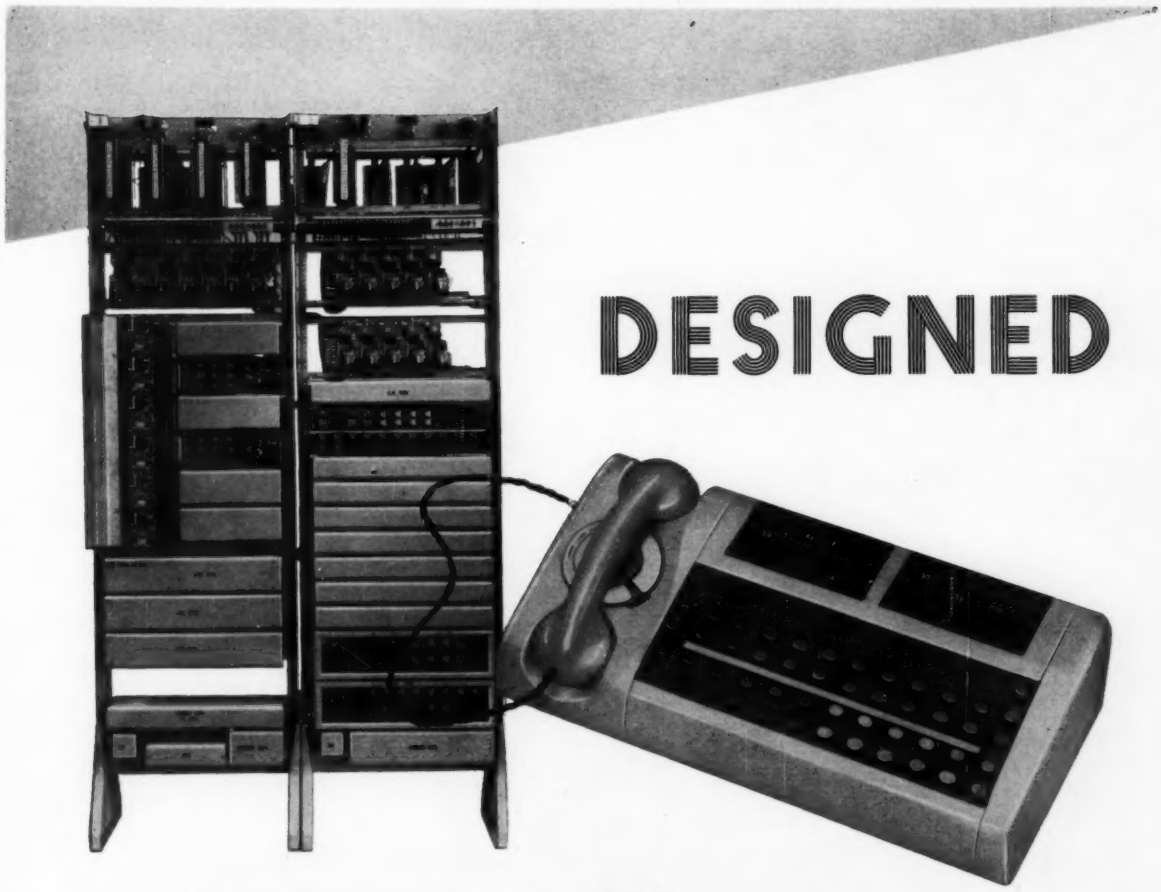

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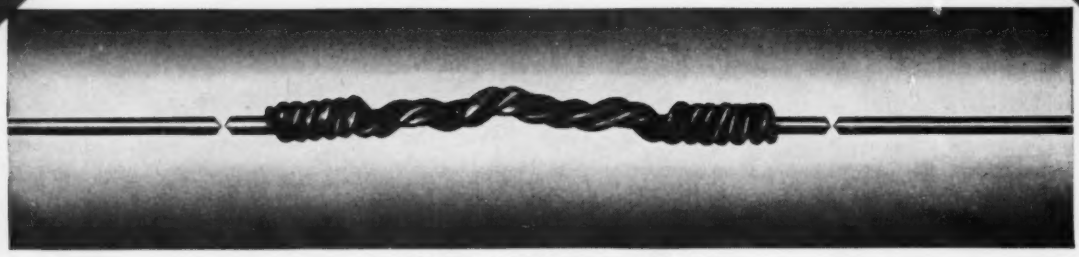

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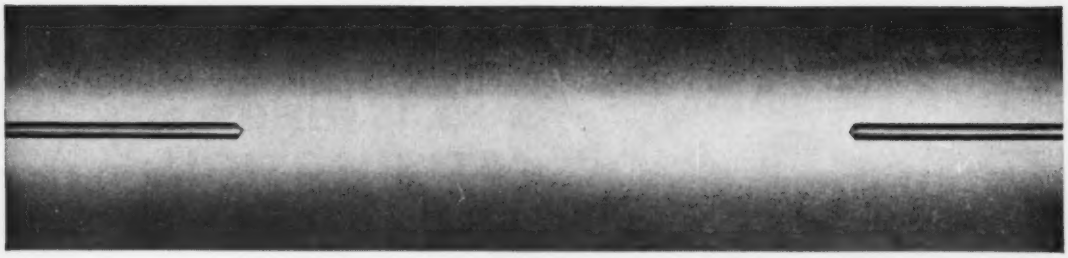

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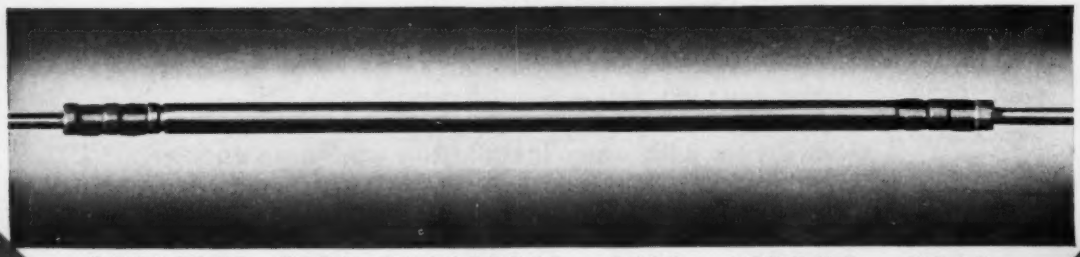

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